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THE ASSOCIATION METHOD IN ITS RELATION TO THE COMPLEX AND COMPLEX INDICATORS

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A. INTRODUCTION

A large number of present-day tendencies in psychology seem to be directed toward individual differentiation and subjective analysis. The farther we advance into these realms of investigation, the more are we overpowered by the burdens of our ignorance. Nevertheless, the contributions made to psychology in the last decade or two, show conclusively that we are successfully wedging our way into the dark, hidden recesses of our "Denkfabrik." Our senses are as yet too dull, too undeveloped, too inaccurate to appreciate the finer, inner workings of our psyche. That some day the science will be in a position to explain a large number if not all of the mental mechanisms is the confident belief of many. At present, we must be content with objective results, verified and supplemented by introspection.

B. SOME PSYCHOLOGICAL CONCEPTS

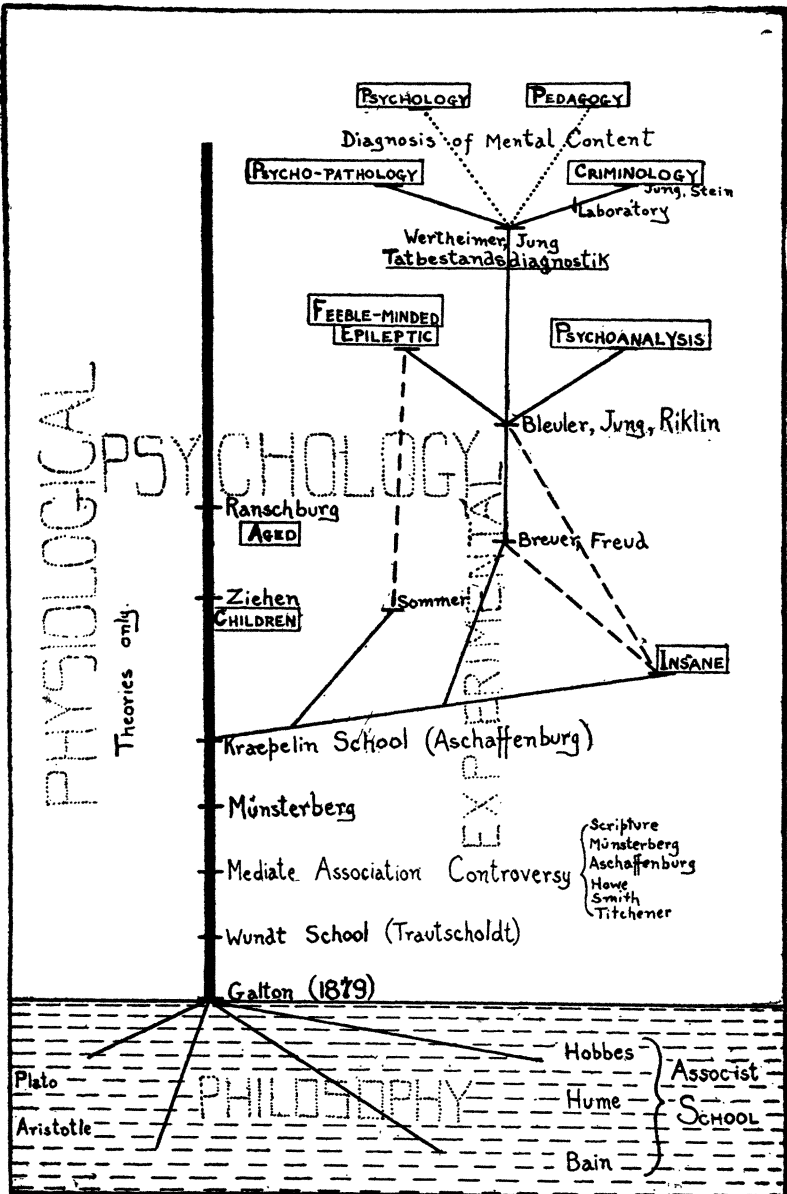
The process of association is, from the synthetic point of view, the keystone of our mental life. It would be folly to maintain at this date, with Hobbes, Hume, Bain and the rest, that the phenomenon of association is the *all* of consciousness. We must admit, however, that it is one of the basic factors making for normal mental activity. Perception, thought, action cease when the association process is interfered with. The laws of memory, of habit, of thought, are but a restatement of the laws of association.

Besides frequency, vividness, recency, primacy, intensity, and emotional congruity, there are a large number of factors which tend to influence the relations between ideas. (It is these *relations*, by the way, which we have in mind when we speak of "association.") And every attempt to arbitrarily classify these connections into different categories, outer, inner, egocentric, mediate and so on, has failed in many respects. This condition has largely been due to one or more of these reasons: (1) the tendency of classifications to be artificial; (2) their tendency to be superficial; (3) they are not based on introspection, and as a result they are objective instead of being subjective; (4) the separate categories are not sufficiently exclusive; (5) the experimenter may not correctly interpret the response; (6) the presence of mental imagery aroused by the stimulus is but poorly expressed by a single-word response; (7) our associative procedure is probably too complicated to bear a minute analysis, as yet.

It is not surprising, then, to find Cordes criticizing the early experimenters in this field for making such a simple process of the associative mechanism. He attempts an improvement by dividing it into two divisions, naming one the "A"-phenomenon, which includes the reception of the stimulus and the character and state of consciousness at the time, and the other, the "B"-phenomenon, which includes the response and the mental state at that time. This analysis is but a mere beginning. We have not advanced very far beyond it since. It is interesting to note that Jung and Riklin, mindful of Cordes' conclusions, designate their experiments as "verbal reactions to stimuli."

According to Hobbes, the natural state of one's ideas is uncontrolled, desires and wishes directing the train of thought. Where will and desire are more or less destroyed, as in dementia, the flow of ideas remains uncontrolled. It is recognized now, however, that ideas come to consciousness not only independently of our will, but oftentimes even against it. We see the extreme form of this in melancholia and in the obsession psychoses. For Wundt, this directing is done by apperception. He differentiates between perception and apperception as follows: In perception the idea is present in the field or "Blickfeld" of consciousness; in apperception, the idea is in the center or "Blickpunkt" of consciousness. Ziehen maintains that Wundt drives this theory of apperception a little too far, making the process superior even to that of association. The assumption that apperception is a sort of special selective faculty located somewhere in the frontal lobes of the brain, makes one justly wonder whether Wundt is not here being unconsciously influenced by the old faculty psychology. Sutherland emphasizes the fact that as yet we know too little of apperception to undertake a study of its influence on one's train of ideas.

The neurologic mechanism of association is still a matter of speculation. But whether it be conceived as neural habit, least resistance, "drainage," or what not, these phenomena *are* apparent: the process of association remains constant in its manifestations, it obeys certain laws, it can be studied experimentally, and the results may be utilized for educational and psychotherapeutic purposes. The nervous system receives and stores impressions. It consequently presents the paradox of being unchanged in what it has already acquired, and of constantly changing through what it is continually receiving. We must also recognize that the unconscious is the great storehouse of impressions.



A TREE OF DEVELOPMENT
to illustrate the progress of association experiments

C. SIGNIFICANCE OF ASSOCIATION PHENOMENA

Keeping this in mind, let us ask what is the significance of association phenomena. To Bleuler, "The process of association epitomizes the complete psyche, the past as well as the future with all of its experiences and aspirations. It is an index to all mental phenomena, which we only need to decipher in order to obtain a complete knowledge of man."

Semon has given to science the "mnemic" theory, the main thesis of which had long before been held by such men as Claude Bernard, Haeckel, Orr, Cope, Nägeli, Hertwig, Hering, Samuel Butler, and which is now being so ably supported by Hering, Semon and Francis Darwin, among others. It postulates, first, the possibility of stimuli leaving traces or engrams in an organism; and secondly, a dormant condition of engrammatic characters in both soma and germ-plasm, which become active as the individual develops. According to this theory the growth of the chick from the egg is merely an act of memory long imprinted upon the animal mechanism. With the conjugation of the germ cells, memory begins its marvelous process of regular, unchangeable activity. Each completed act serves as a stimulus for the next one. What appears a rather simple structure, is literally charged with vast complexes of memories. The greater the charge, of course, the higher up is the organism in the phyletic series. Ribot even goes so far as to say that "memory is essentially a biological phenomenon and only accidentally a psychological one."

Much as one wishes to adhere to Weismannian principles, it is very difficult to conceive that progress leaves no transmissible trace or "engram" upon the individual. The modification, no doubt, is most microscopic, most minute. But without postulating its existence, how can we explain many of the facts of heredity?

Man's progress up the evolutionary ladder has not been a smooth or regular one. To reach his present state of development, he has been compelled to pass through severe, oft-times cruel, sharp struggles in order to obtain food, warmth, shelter, protection, for the purpose of preserving the life and vigor of both individual and species. The slow convulsions of nature forced him into an ever-constant adaptation to climate and environment. He was driven into perpetual experimentation, with its attendant sore trials, harshly-reacting errors, as well as triumphant successes and happy achievements. The joys and fears, the pleasures and pains of the

intense effort upward must have left their traces somewhere in the organism.

Like the cells of the developing chick, we are often impelled to acts, to thoughts, by a something in us which is inexplicable, undefinable. Schopenhauer, in his essay "On Virtue," says the following: "The lover is deluded in thinking that he aims at his own happiness. The will to live is forcing him, for nature's own purposes, to aim at a certain typical beauty, which has its end in the perfection of the offspring. The more perfectly two individuals are adapted to each other, the stronger will be their mutual passion. Nature is striving for a better realization of the type, and to attain its ends must implant a certain illusion in the individual. That which is good only for the species appears to him as good for himself. This illusion is instinct. The individual is but a helpless tool carrying out blindly the designs of nature." Le Bon, in his "Psychology of the Crowd," says, "behind the avowed causes of our acts there undoubtedly lie secret causes that we do not avow, but behind these secret causes there are many others more secret still, which we ourselves ignore. The greater part of our actions are the result of hidden motives which escape our observation." Swoboda and Fliess have demonstrated the theory of periodicity in human activity, a phenomenon quite independent of volition.

Just as the human frame is an "old curiosity shop" full of unnecessary antiques, so also is the human psyche a vast storehouse for the stirring, epoch-making events of phylogenesis. Since refined surgical and histological methods reveal a mass of rudimentary and vestigial organs, may we not also expect that refined psychological procedure will reveal as much, if not much more, on the mental side? Already psychoanalysis has made an excellent beginning.

Leaving these purely theoretical and hypothetical considerations aside, we will now enter the problem proper, with a short review of the experiments in association for purposes of better orientation.

D. HISTORICAL SURVEY

The phenomenon of association had been observed by Plato and Aristotle. They classified the relations between ideas into logical categories. The study and discussion of this whole problem was continued in the realms of philosophy culminating in the extreme views of the associationist school. The experimental work began with Galton in 1879. His method was simple and crude. He, nevertheless, obtained very valu-

able results. In 1880, Wundt took the problem into his laboratory and in 1883, Trautscholdt published an extended article on the subject. In 1885 followed Wahle. In 1889, Münsterberg published his "Beiträge," giving an account of association in adults. Three years later began the controversy on mediate association, Scripture, Aschaffenburg, Münsterberg and Wundt being the participants; later Cordes, Howe, W. G. Smith and Titchener were added.

It is natural to expect that the first movements should be concerned with the *mechanism* of association, the process being considered detached from the individual. Rittershaus, however, is unrelenting in his criticism. He distinctly emphasizes the fact that it is altogether impossible for us to possess a purely abstract psychology of association before we possess a concrete, individualistic one. He, like many other critics, takes these experimenters too harshly to task failing to realize that the whole problem was passing through a normal, wholesome evolution.

Beginning with Kraepelin in 1896, we notice a deviation from past methods, first as regards the aims of the experiments, and secondly, as regards classification. Kraepelin was the first to outline an extensive program for the investigation of neuropathic and psychopathic conditions. He studied the effects of practice and drugs on association. Of his students, Bethmann investigated the relation of mental work to changes in association,—Aschaffenburg, the effects of fatigue and exhaustion,—Weygandt, the effects of hunger. Aschaffenburg made some radical changes in the hard and fast, iron-bound classification of the Wundtians. He readjusted it to permit the inclusion of marked deviations due to some abnormality.

In France, Ribot was the first to emphasize the significance of individual differences and to differentiate types; Bourdon was mostly concerned with classification, and Dugas did work similar to that of Ribot. In America, Cattell, Calkins and Jastrow were the chief workers in this field. Eighteen hundred and ninety-eight saw the appearance of Ziehen's masterful contribution to the association of ideas in children. His predecessors in this field were many, but Ziehen was the first to make a thorough, scientific study of the subject. He also attacked the logical method of classification because it neglected content and was only interested in form. Unfortunately, it was hard for Ziehen to break away wholly from these preconceptions, and the results obtained from adults influenced his methods, as well as the interpretation of his data, too greatly.

At about this time appeared Ranschburg's article on association in the aged. In 1899 appeared Sommer's "Lehrbuch." By 1906, the Zürich School was already well organized and it began its epoch-making series of contributions headed principally by Jung and Riklin. From these studies dates the work which will be more intensively discussed later, and which makes apparent the enormous significance of the phenomena of associated ideas. Jung and Riklin opened the doors of the subconscious. Immediately the complex was seen in its true significance. At present, this knowledge is being utilized in three directions, first, to determine the relation of the complex to aetiology in mental disorders; second, to determine its relation to mental content; third, to determine its relation to impulses, ambition, ideals, character.

For bibliographies, the following may be consulted since they cover a large part of the literature (see bibliography):

Claparède. *L'association des idées*. 1903.

Ley and Menzerath. *L'étude expérimentale de l'association des idées*. 1911.

Rittershaus. *Die Komplexforschung*. 1910.

Lipmann. *Die Spuren interessebetonter Erlebnisse und ihre Symptome*. 1911.

E. CONSTELLATION AND COMPLEX

I. *Definition*

Coming to our problem more specifically, let us define our terms. The literature is very vague in the use of the words "constellation" and "complex." All writers, with but few exceptions, have a tendency to handle them very loosely, carelessly and ambiguously. For that reason, a definition which is accurate and at the same time in accord with common usage is practically impossible. I will make an attempt, however.

Ziehen was the first to use "constellation" in its present significance. To him "constellation" was an associative grouping of various ideas around a central idea. Thus,—assuming *a* to be a central idea, there may be associated with it in consciousness, *b*, *c*, *d*, *e*, etc. At one moment the recall of *a* may recall *b*; at another, *c* may be recalled; and so on. Jung and Riklin modify this definition by adding that the experience creating a constellation of ideas must have been individual, subjective, have occurred within recent time and must possess a distinct feeling-tone. As it is used to-day, "constellation" means an associative arrangement of specific mental data. This mental data may consist of sensations, percep-

tions, ideas, impulses, desires, feelings, and so on. Any of these, and all of these in various combinations, are the units which compose the constellation. The mental data must not necessarily be pure ideas, as is held by some. In analyzing constellations, it will be found that each is composed of a different mosaic of mental elements, differing in character, significance, intensity and meaning. Also, since sensations, perceptions, memories, always possess affective accompaniments, all constellations, which are only hierarchies of these mental elements, possess some *feeling* tone. In many instances, it is so slight as to remain unnoticed, and in others it is so intense as to force the constellation to become transformed into the complex. The difference between a constellation and a complex is a difference of intensity in affective-tone. Education, environment, home influences, age, sex, race, religion, certain hereditary predispositions, are among the most important factors determining the type, number, and trend of one's constellations.

As has already been indicated, the complex is merely a constellation possessing a more intense affective-toning. Some writers maintain that this feeling element must be one of pain. With this position I disagree, since pain is only a small portion of the enormous field of affection. The constellation becomes a complex when the affective content changes from feeling to emotion. It must be particularly emphasized that the existence of complexes in consciousness or in the unconscious, is neither pathogenic nor pathognomonic. The phenomenon is perfectly normal. We all possess complexes. We are aided by some, we have to contend with others, still others are sublimated and we are better off as a result. It is the neurotic who suffers.¹ Any complex coming into conflict with ethical or aesthetic principles may, after a struggle for dominance, be repressed (*verdrängt*) into the unconscious where it continues its efforts to reach the "Blickpunkt," the center, of consciousness.² With neurotics these complexes increase, unify and exist apart

¹ And in this respect, the recent psychoanalyses of psychopaths and criminals, on the one hand, and geniuses, artists, poets, on the other, reveal that the operation of the complex in both types is very much alike. Consequently, our future treatment of the social deviate both before and after committing an offense must take this fact into consideration.

² Freud gives some interesting explanations in this connection with regard to forgetting generally, as well as infantile amnesia and cover-memories ("*Deckerinnerungen*"). The censor, an active, mental principle similar to Wundt's apperception, selects and rejects ideas as they come to consciousness.

from the primary personality. In this manner, one or more secondary entities or personalities may be created which live a life apart from the primary one. The complex thus obtains expression. With normal people the complex often obtains externalization through symbolism, displacement, conversion, transference, and through the channels of literature, art, humor, dreams. For further elucidation of these, and other phenomena, the reader is referred to the psychoanalytic literature.³ We are all, in a slight manner, however, examples of split-off personalities. This fact becomes clearer as we note a man's intellectual advance with age, the process of specialization becoming more and more apparent. All of us are a bundle of characters, of selves, each very different from the other, and each in varying stages of development. The individual at a baseball game is apparently totally unlike the one delivering a lecture on metaphysics; he is totally unlike the one leading a "gang" of boys into the open country; very different from the one standing judge over the seriousness of his moral transgressions; and totally unlike the one confessing deep and earnest affection for a pretty representative of the weaker sex. Yet all of the metamorphoses of self are due to changes of the predominating mass of complexes and constellations. These diverse personalities are normal manifestations, all being moulded into an harmonious unit. Synthesis is the keynote of mental hygiene. Where complexes have been repressed, and are split off or dissociated, there one is certain to find definite psychopathologic conditions.

The following are some conclusions relative to the emotional content of the complex by experimenters in this field: Birnbaum believes that the affective-toning possessed by a complex changes with time. According to Burr and Geissler, most of the normal, every-day complexes, and there are many of them, are not marked by very strong feelings. Jung and Riklin observed that during distraction the number of complexes discoverable in a given subject was greatly reduced. They also found, and to this Sutherland takes exception, that complexes do not necessarily have to be apparent to the sub-

³ And here, perhaps, a word might be said concerning Freudianism. Many of the Freudian postulates cannot as yet be accepted in their entirety by the critical mind, as explanations of some existing conditions. None the less, there is a good deal which is valuable in the analyses, but one must be discriminating. The attempt to reduce so much of human activity and defectiveness to a sexual basis (in its broadest sense), is bound to fail. It is generally known and recognized that the predominating forces of life are not *all* exclusively libidinous.

ject, for the experimenter to be certain of their existence. They usually remain unnoticed until the association data are properly evaluated. According to Jung and Riklin's findings, confirmed by Rittershaus, most of the complexes are of an erotic, libidinous nature, thus emphasizing their great rôle in human behavior. Gallus stresses the fact that sometimes complexes are uncovered where one would least expect to find them, and at other times, where one is most certain of their presence, none exist.

II. *The Unconscious*

The complex and the unconscious are of great significance for normal psychology as well as for psychopathology. Investigations of hysteria, dementia præcox, paranoia, have already revealed a mass of data concerning the mechanism of the complex. All neuroses, according to the Freudians, are based on definite complexes. Normal psychology is now ready to take the path marked out by these pioneer workers in the field of mental disorders. The phenomena of forgetting, moods, character, likes and dislikes, ambitions, mental and physical ability, habits, the development of special aptitudes, all stand in close and intimate relationship to the complex and the constellation.

Probably the most important deduction one can make from "Komplexelehre," is that: *The moment a complex is created, it becomes a potent dynamic unit.*

F. THE ASSOCIATION METHODS

We now come to a consideration of the various procedures employed in detecting the existence of constellations and complexes. My thesis will include only the so-called free-association methods. In reality there is no "free" association. The relations between ideas are not accidental, but predetermined, and various factors influencing the appearance of an "Einstellung" will also influence the train of thought.

The aim of the association methods herein described is mainly to indicate the existence of complexes, or the possession of knowledge of a certain type (crime, or "Tatbestand" [constellation of facts]). Their application can be made to cover a much wider field, and may perhaps some day aid in the solution of the problem of higher mental tests for the Binet scale. The fundamental principles underlying the methods are as follows:

(1) An experience leaves some sort of trace in the psyche. Ideas are linked up which were not previously related, or the bonds which did previously exist are greatly strengthened.

(2) Relations between ideas can be proven to exist by the association method.

(3) By means of a properly arranged experiment upon two individuals, one possessing a specific constellation and the other not, one may determine fairly safely (using the response, qualitative, quantitative and physiological, as a criterion) which of the two possesses the specific constellation.⁴

I THE ASSOCIATION SERIES

(1) *The Series Proper*

(a) *Number of Words*

Although there is a difference of opinion as to the number of words composing the series, it is generally held that 100 is the "happy" medium. According to Ley and Menzerath, the Jung series of 100 or 200 words is entirely too long. They favor one ranging from twenty to fifty words. Aschaffenburg points out that where 200 words are used as stimuli, the conditions under which the first twenty-five are reacted to, cannot be the same as those for the last twenty-five. Comparisons, consequently, may give entirely false results. At the other extreme is Kramer who maintains that the 100-word series is too small. It must be kept in mind, however, that fatigue may easily set in, and that the subject's attention may begin to be removed from the main purpose of the experiment. Lipmann states that 100 words should be the smallest number employed, and actually favors a longer series, since length finally destroys dissimulation. The more a person has reacted, the more will his mode of reaction become mechanized and the more independent will it become of volition. Repression and inhibition being reduced to a minimum, the complex or constellation can consequently be more easily reached. He believes that the larger the series, up to a certain point, the better the results. But a good deal depends on the purpose of the experiment, the mental type of the subject, the speed of the experimenter, general conditions and circumstances, for all of which allowances must be made. As to the time, Ziehen and Sommer never permitted their experiments to run over twenty minutes. It was usually between ten and fifteen.

⁴ The distinction between an association test and a psychanalysis is this,—the association test establishes or confirms the existence of relations between ideas. It stops there. The psychanalytic method goes farther, and attempts to explain or interpret these relations by a closer, more intensive questioning, and its final aim is catharsis, "chimney-sweeping." The psychanalytic concept, however, is broadening out to mean more than what I have indicated.

Woodworth and Wells state that it requires from ten to twenty-five minutes to give the K. R. series of 100 words. Jung sets no limit as to time, but if fatigue is observed at the end of the first hundred words, the second series of 100 are reserved for another day. This has never been necessary with educated subjects. In conclusion, Löffler suggests that the association series ought to be different for every individual.

(b) *Character and Arrangement of the Words Chosen.*

The association series ought to be composed of relevant and irrelevant stimulus words, by relevant words meaning those related to a complex, and by irrelevant, words unrelated to it. Only to the first type is the subject expected to react suspiciously. The relevant or significant words are assumed to be irrelevant or insignificant to controls. Of course, in actuality, this is never entirely possible. Words of double meaning ought also to be included. Lipmann summarizes the necessary requirements of relevant stimuli by saying that they must be such as not to touch complexes possessed generally, they must not be unusual, difficult to understand, exceptional, they must not be easily distinguishable from the irrelevant either in the number of syllables or in grammatical form. Such procedure as that of Van der Hoeven, two irrelevant words being placed after each relevant one, is not scientifically advisable. There ought to be no regular array of significant and insignificant stimuli. Lipmann adds that the series should be so arranged that the subject will be surprised when confronted by a complex stimulus. He, consequently, advises the irrelevancy of the first ten words in order to mechanize the mode of reaction. Löffler and Lipmann also suggest arranging the words so that before a significant stimulus is reached an "Einstellung" of such a character will have been created that a complex-reaction will be greatly facilitated. Lipmann advises the following order of irrelevant and relevant words in the series: (r=relevant; i=irrelevant; s r=strong relevant)—ten i—four r—ten i—six r—eight i—one s r—six i—six r—fifteen i—one s r—ten i—eight r—eight i—seven r. (Total, sixty-seven i and thirty-three r.) Rittershaus is very much opposed to this arbitrary schematization, stating that no experimenter is able to formulate a series of relevant and irrelevant stimuli since no one but the subject can determine their character, and then only by means of his responses. In his experiment Schnitzler used twenty critical words which were as gross as possible (forceps, blood, etc.). According to other investigators, this greatly militated against the accuracy of his results. Thus

Löffler and Rittershaus maintain that gross, coarse stimuli ought not be utilized in searching out a painful spot. For, just as the physician is careful of his movements, tender in his touch during a diagnosis, so also must be the explorations of the psychologist, who is seeking for complexes in the innermost reaches of the psyche. With regard to critical stimuli, no set list can be given which might be employed by all. It must be remembered that conditions, subjects and experimenters vary greatly. However, Jung found that these words, among others, usually gave long reaction times: needle, hope, strange, false, heart, pyramid, strike, threaten, remember, ripe, to woo, fern, hair, nauseate, dream, paper, book, harm, softly, caress, family, consciousness, freedom, faith, violence, wonder. According to Wells, using the Kent-Rosanoff series (twenty-five cases), the ten words giving the shortest reaction times were: bitter, ocean, white, dark, yellow, swift, thirsty, sour, stove, scissors; and the ten words of longest reaction time were: square, command, anger, religion, moon, slow, health, justice, stomach, wish. Words to which some of the men (physicians) failed to respond were: intend, never, interest; and women (nurses):—disgrace, betray, expect, information, cravat, magnet, diagram.

(c) *Trial Series.*

It is advisable to give each subject a short explanation of the method to be pursued with short, simple, definite directions for reacting. A trial series of insignificant material consisting of ten to twenty words ought to be employed mainly for the purpose of making the directions and information concrete, and permitting the subject to become better oriented to the problem. By means of this trial series, the experimenter can obtain a better insight into the mental type of his subject. Kramer and Stern used a trial series of 100 words, but this length is neither necessary nor profitable.

(2) *Presentation of the Stimulus*

(a) *Mode of Presentation.*

There are two forms in which the stimuli may be presented. First, in auditory fashion, either by the experimenter, pronouncing them,⁵ or as Lipmann suggests, by means of a phono-

⁵As yet, we know but little of the mental processes which are brought into activity in the subject by the manner and tone in which the stimulus is given. Cordes earlier, and Levy-Suhl later, both emphasized this point.

graph. (The latter, Rittershaus calls "scientific fool's play.") The stimuli may also be presented visually by using the tachistoscope. But Rittershaus advises against the use of this extra apparatus, since it only complicates the procedure and may disturb the results. Besides,—some subjects cannot read very easily, some may have some apperceptive difficulty, others may feel compelled to translate the seen word into auditory, motor, or voco-motor terms in order to grasp its meaning. In the last case especially, the effort may result in an audible pronouncing of the stimulus which, by some careless experimenter, might be interpreted as a mechanical repetition and diagnostic of a complex. The tachistoscope, nevertheless, has the advantage of being independent of any personal influence of the experimenter, the stimuli remain constant, which factor also favors the use of the phonograph for auditory stimuli, and pictures, colors, etc., as well as words, may be presented. Lipmann indicates the value of the tachistoscope for the phenomenon of "Verlesen," of misreading,—e. g., a person guilty of murder, instead of seeing the stimulus "Mord"—will see it as "Mord." The same holds true of the phonograph (Verhören), the word Olch is heard as Dolch (dagger) by the murderer, as Strolch (tramp) by the tramp, and as Molch (salamander) by the innocent. Cordes maintains that visual stimuli are stronger and better to work with than those of an auditory type, and that ideas come more spontaneously when the word is seen than when it is heard. As we have remarked above, this latter depends greatly upon the individual. He goes on to state that we are more accustomed to *seeing* isolated words than to *hearing* them, and that the *amount* of impression remains constant with visual stimuli, and cannot remain constant with stimuli of the auditory type. Ziehen, in studying the associations of children in the fields of color, space, number and time, utilized various methods of presentation.

In the older experiments, where words were presented visually, the subject was seated in a dark chamber, entirely sound-proof. Pictures, symbols, colors, colored letters or words, single letters, nonsense-syllables, were presented by means of an exposure apparatus. This procedure is not much in vogue now, although Wundt prefers it to others.

On the whole, the best procedure is to have the experimenter pronounce the words himself, aiming, at the same time, to keep conditions as constant as possible. Lipmann suggests that the tempo ought not be too slow. The next stimulus should be given as soon after the response as pos-

sible. Thus the constellation is kept intact and no opportunity is given the subject to prepare a response. Aschaffenburg obtained, on the average, 200 associations in forty minutes or five associations per minute. In other words, in about every twelve seconds the whole process of presenting the stimulus, recording the response and holding a protocol was complete. Cordes states that this time is too short. Other authors give no data. Although it seems advisable to standardize the time, yet subjects and experimenters present such wide variations in rate of activity, that it would be almost impossible to strictly adhere to any set time without injuring the experiment. If any additional apparatus is used, such as a galvanometer, a pneumograph, automatograph, etc., more time must be allowed. This has its disadvantages, of course. Lipmann also states that the rendition of complex-stimuli ought not be especially emphasized in tone, in pause, or accent, no changes ought be noticeable in gesture or facial expression of the experimenter.

(b) *Instructions*

The method pursued in the association experiments is as follows: The experimenter gives the stimulus word and the subject is asked to respond with the first idea that occurs to him.⁶ This "Aufgabe" may be put in various forms—"answer as quickly as possible with the first word that comes to your mind,"—or "with the first thing this word makes you think of."—(In German,—“zu antworten mit das erste Wort das klar zum Bewusstsein kommt”—or “mit dem nächst einfallenden Wort zu antworten.”) That the response will be but a small portion of a complicated association-complex is self-evident. Nevertheless, valuable results may be obtained, despite this handicap. Wertheimer and Klein have shown that only a slight stimulus is necessary to bring to light a whole crime-complex. Schnitzler, on the other hand, altogether denies the possibility of arousing a single association of a definite kind by means of a single stimulus word.

The procedure in which idea *a* calls up *b*, *m* calls up *n*, *g* calls up *h*, is called the reaction method. This differs from the *serial* method in which when *a* is given, *b* is associated.

⁶ In reality, this procedure is only a simplification of the one usually adhered to in obtaining information, namely, questions are asked and the subject or patient is required to answer them to the best of his knowledge and ability. On the basis of this material, its amount and character, one is often able to pass a fairly safe judgment.

Then follows *c* in association with *b*, then *d* in association with *c*, and so on (*a* → *b* → *c* → *d* [C. S. Meyer]). Only the first type is being considered in this paper.

Sutherland found that a slight variation in stating the directions produced no observable difference in the response. Ziehen, working with children, sometimes repeated directions in order to hurry them on. This fact was always noted on the record sheet. He found no difference in results when the stimulus was given in a soft or a loud tone of voice. It would be much more advisable to keep *all* conditions as constant as possible *all* the time. In many experiments such as those of Kramer and Stern and of Rittershaus, it was found advisable to have one person give the association-series and note the response, while the other recorded the time.

(3) *Response*

To quote Wells, "In spite of all instructions to the subject about the 'very *first* word that comes into your mind,' etc., and the best coöperativeness, it is naïve to suppose that we get this response from the ordinary subject save in a comparatively small number of cases." Aschaffenburg also makes the observation that after the stimulus word is given, a large number of ideas may suddenly come into the conscious field of the subject. Usually, one is more dominant than the rest and thus finds expression. Trautscholdt and Wertheimer indicate that the reaction to the stimulus may come to consciousness first in terms of sensory, motor or kinaesthetic imagery, also as moods and feelings. From introspective accounts, the latter found that sometimes the stimulus word, as such, comes into consciousness. Other times it was a visual image of an article in the room, of which the complex-arousing word was a part. All imagery differed in intensity, clearness, and duration. Sometimes a peculiar awareness or attitude (*Bewusstseinslage*) was present, there was a consciousness of *seeking* something, of trying to remember, *e. g.*, (to quote from the introspections) "That is a word (content) which I have but shortly seen," "that is somewhat critical," "that is betraying," "I ought not to express this." Wertheimer also observed that the appearance of a reaction word was always present with a strong impulse to express it. The following are some of the reports: "The complex-reaction burst out suddenly without permitting me sufficient time to judge whether I wanted to say the word or not." "The desire not to express a betraying word was very strong, nevertheless the content was of such

great strength that it forced itself through these barriers." "I could do nothing else; I knew perfectly well that I ought not to say the word, but I could do nothing else, the pressure was too great." "I wanted to substitute another word, but I uttered the word which I did not want to." "It took me unawares, I could not stop it." "The complex-word was present with such power, that it suppressed any emerging irrelevant word." "I could think of nothing else." In the cases where reaction-words were successfully repressed, a peculiar condition, called a "mental vacuum" was produced. These are some of the reports: "There was a complete emptying of conscious material." "It feels as if everything had disappeared from consciousness, an absolute lack of ideas." Very often this condition of mental vacuum was accompanied by a distinct feeling-tone, described as "uncomfortable," "painful," "a feeling of tension, suspense," "a feeling of perplexity." In some cases it even took the form of "a feeling of fear, no word will come into consciousness, time is quickly passing, perhaps a complex-word will appear." This condition ceased when a word was finally spoken or when an active "search" was instituted for an appropriate response. In this connection, it might be mentioned that Schnitzler observed a number of cases where an irrelevant response followed quickly after the complex-stimulus was given. In such cases, the real significance of the stimulus word became apparent to the subject only after the irrelevant reaction had already been expressed.

The recorder is expected to note everything possible—the response, the reaction time, the behavior, all movements and expressions. The significance of this data will be discussed later under complex-symptoms.

(4) *Miscellaneous*

(a) *Sex and Personality of the Experimenter*

Both Pfenninger and Morawitz indicate that the psychosexual "Einstellung" of a subject must have some effect on the response and reaction time. This "Einstellung" naturally, varies with the sex of the experimenter. Sutherland also maintains that the type of the investigator (personality, voice, sex, social position) and the type of the person examined (sex, social position) both affect the results before, during and even after the experiment is complete, when an attempt is made to interpret the data. Aptekmann (Zürich laboratory) may be said to be the first to make a direct study of this

problem. Her procedure, however, is open to grave criticism. Her subjects were six educated men and six educated women. Jung and Aptekmann each served as experimenter and both their results were compared. She concludes as follows: (1) The *male* experimenter produced greater affective changes in the subject. (2) Where the experimenter and subject were of the *same* sex, more *social* complexes appeared; where they were of the *opposite* sex, more *erotic* complexes appeared. More data are sorely needed.

(b) *Factors Influencing Associative Relations*

(1) Age.—Ziehen found that children respond with *particular* ideas, whereas about eighty per cent. of adult responses are by means of *general* ideas,—again confirming the long-established fact that children deal with particulars. The reaction time with children is longer than with adults. Children give about two per cent. verbal or word associations. With adults this percentage is much increased. Ziehen and Meumann found that children between six and thirteen who gave a larger proportion of particular ideas, were the brighter. Ranschburg found that adults gave 11.8 per cent. more inner associations than younger people. Jung and Riklin found the same to be true in their investigations. In other words, the older a person, the greater the probability that words will be associated by content, by inner significance, and not by mere sound, or any other objective relation. The first type of response (inner association) results in a longer reaction time. This relative difference does not change with age.

(2) Sex.—Jung states that the method is as yet not sufficiently developed to show the finer sex differences. Still he and others did obtain some very interesting data. Rittershaus has indicated that the larger portion of complexes belong to the sex sphere. The percentage is greater in women than in men. Wells observed that of the rather long reactions, the men gave eighteen, the women seventy-two. Haggerty and Kempf have pointed out that a large part of sex differences were due to attempts at suppression and substitution. Women show a shorter reaction time compared with men when there is *no* inhibition, and a longer time than men when inhibition is active. These results agree with Pfenninger's findings. Wells noticed that some women show marked deviations from the average of their sex. Sometimes, consequently, a careless statistical treatment of data may greatly falsify the facts. The statement, so often made by Jung, that women give longer reaction times, does not hold strictly. An examination of his

data makes Wells conclude that there are two types of women, (1) those whose responses conform to the average of their sex, these subjects giving a shorter reaction time than men, (2) those whose responses show great deviations. The two groups ought to be considered separately, especially when making generalizations in the matter of reaction time.

Jung and Riklin found that men give a larger proportion of egocentric reactions. Educated men and educated women differ only slightly in their responses. Uneducated men show a much lower type of reaction than uneducated women, this difference being due very largely to man's meagreness of affectivity and subjectivity. This, of course, does not hold for educated men. From these results, one is naturally led to believe that educated men possess more feministic characteristics than uneducated men. Which is perhaps additional confirmation to those who believe that woman is higher in evolutionary development than man.

Kramer and Stern observed that, in revealing the existence of a complex through content, only *one* reaction was needed in the case of men. With women, on the other hand, the diagnosis is not as simple and requires a number of responses before judgment can be passed. H. Gross explains this phenomenon on the basis of woman's almost instinctive tendency to secrecy. A woman has more to hide than a man, *e. g.*, menstruation, pregnancy, her interest in her husband, etc. She must be more careful in her speech than man is. With the development of society, its customs and taboos, she has finally acquired a natural tendency to keep from revealing her innermost thoughts. Perhaps this is so, and woman's reputation for talkativeness may only be an Adlerian "compensation" for her "minderwertigkeit" in these other directions. Other experimental data, such as that of Jung, does not seem to bear this out.

A quantitative, but not qualitative, examination of attention by Jung and Riklin indicated that uneducated women are superior to educated men in this respect, due largely to the fact that the situation to the uneducated is new and strange; the experiment being more like a mental test, attention is consequently concentrated. The educated individual approaches the problem as an easy, simple one, and attention is not intensely concentrated.

(3) Race.—Aschaffenburg merely mentions the necessity of further research in this direction, but as yet I have found no work dealing directly with this phase of the problem.

(4) Family.—Jung and Riklin noticed resemblances in the reactions of members of the same family. Emma Fürst confirmed their findings.

Jung and Riklin, for example, cite this case:

Age	Inner	Outer	"Klang" or Sound Egocentric	
Mother over 50.....	75%	19%	0%	40%
Older daughter about 38....	56%	39%	1%	15%
Younger daughter about 35	35%	58%	5.5%	7%

This data, however, is liable to be a little misleading. One would suppose that when the younger daughter attains her mother's age, her reactions would be the same as those of the parent. This cannot be the case. For example, comparing the two sisters who differ in age by about three years, it is very, very questionable whether the younger sister will in three years give 56% of inner associations instead of 35%, an increase of 21%—or give only 1% of sound associations instead of 5.5%.

Besides concluding that relatives show a marked agreement in reaction type, Emma Fürst also adds that children tend to resemble the reaction type of the mother more than that of the father. There is a smaller difference between father and son, than between father and daughter,—and a smaller difference between mother and daughter, than between mother and son.

(5) Intelligence.—Rittershaus indicates that subjects coming from a lower level of intelligence are not accustomed to think in terms of single words or ideas, but in sentences. Believing that the experiment is a sort of intelligence test, they tend to say as much as they can in response to the stimulus.

The following is taken from Jung's data:

The reaction time of educated men—averages 1.3 seconds;
 The reaction time of uneducated men—1.6 seconds.
 The reaction time of educated women—averages 1.7 seconds;
 The reaction time of uneducated women—2.2 seconds.
 Average for the educated, 1.5—for uneducated, 1.9.

Jung's results also show, to one's surprise, that the uneducated give more inner associations in the following proportions,—43:36%, and less outer associations,—53:59%. Because of this greater proportion of the inner type, the uneducated give a longer reaction time.

Sommer and others have found that the feeble-minded, some of the insane and the epileptic show a striking poverty

of ideas and tend to give stereotyped responses. Among others, Sommer cites this case:

Male: dement and epileptic.

Out of forty-six reactions—

	table	was	the	response	to	13	of	the	stimulus	words.
bone	"	"	"	"	"	10	"	"	"	"
house	"	"	"	"	"	3	"	"	"	"
child	"	"	"	"	"	4	"	"	"	"
and dog	"	"	"	"	"	3	"	"	"	"

Some of the long reactions were—

Hand—bone—18 4-5 seconds.

Room—table—27 1-5 seconds.

Lung—lung—22 seconds.

Moravcsik states that those possessing strong mental balance answer with single words instead of with more than one word or with a sentence. Schnitzler warns that many uneducated and ignorant individuals very often may give reactions which appear suspicious without there being any actual basis for it.

(6) Occupation.—Aschaffenburg experimented on two groups of physicians, the first consisting of five, and the second of four, subjects. His results with the first group were as follows:

39 out of 100 reactions were common to two physicians.

16 out of 100 reactions were common to three.

4 out of 100 reactions were common to four.

2 out of 100 reactions were common to all five.

In the second group:

23 out of 100 reactions were common to two.

14 out of 100 reactions were common to three.

0 out of 100 reactions were common to all.

Jung and Riklin give stronger evidence in the following two cases. One is a teacher of natural history. In the first half of the experiment, 26% of his reactions were related to his school work. In the second half, the percentage was twenty-one. In the first half, the name of the school is repeated four times, and a word relating to a certain event which occurred there, twice. The second subject is a chemist. Nearly all of his constellations are related either to his laboratory work or to his love affair. Rittershaus found many complexes in his subjects which were related to their occupations or habits.

(7) Emotion.—Aschaffenburg observed that anger, similar to overwork, insufficient sleep, exhaustion, tends to increase the number of associations by assonance and rhyme. According to Ziehen, emotions greatly influence reaction time,—feelings of pleasure facilitate associations; feelings of pain inhibit

them. This is excellently exemplified in the mental disorders, —mania on the one hand and melancholia on the other. Jung found that the stronger the affective tone possessed by a stimulus word, the greater will be the attention which the subject concentrates upon it,—and in consequence, the number of inner associations will be increased. This process then is just the reverse of distraction.

It is unfortunate that aside from these general considerations, there is nothing else, bearing particularly on this subject, in the literature. Birnbaum in 1911 made a study of the influence of affective factors on association, yet one cannot but be convinced that had Birnbaum utilized all that his predecessors had contributed with regard to method and interpretation, much more valuable and significant results would have been obtained.

(8) Beliefs and Ideals.—Jung and Riklin found that these sometimes stood out very clearly because of their constant repetition in reply to stimulus words.

(9) Fatigue.⁷—Aschaffenburg's results may be summarized as follows (Sommer):

(a) Under the influence of exhaustion, the relationship between stimulus word and reaction word becomes looser and looser, and may be easily broken depending upon the intensity of the original attraction between the two ideas. In this condition, the language relationships predominate, the stimulus word is not perceived by content but by sound. (b) Exhaustion tends to increase the reaction time. This difference is only slight. (c) As exhaustion proceeds, reactions by assonance, rhyme, word-completing and supplementing, and speech reminiscence, increase more and more. (d) Exhaustion brings with it an easier impulse to react. No attempt is present to inhibit the reaction.

Jung and Sommer question whether all of the above phenomena are due always and wholly to exhaustion. Fatigue may serve as a reducer of inhibitions, in which case complexes may more easily be brought to light.

(10) Drugs.—(Alcohol, tea, coffee, etc.) In general, their effect is similar to that of exhaustion. It would be a most interesting problem to determine the effect of internal secretions upon the association process.

(11) Familiarity with Language.—Trautscholdt had observed that unfamiliarity with the language increased the proportion of outer associations.

⁷ Kraepelin differentiates between weariness and fatigue, the former serving merely as a danger signal for the latter.

(12) The Grammatical Form of the Stimulus.—The uneducated, Jung found, possess a greater tendency to react in the same grammatical form, noun to noun, verb to verb, and adjective to adjective. For the educated, the average correspondence was fifty-one per cent.—for uneducated it was fifty-nine per cent. Verb and adjective stimulus words reduce the number of noun reactions to about half. Verbs and adjectives give rise to a larger number of inner associations. Ziehen observed that verbs and adjectives produce longer reaction times than nouns. The most difficult stimuli are, for educated men, concrete nouns, and for uneducated men abstract nouns.

(13) Attention.—This factor will be considered later in discussing the distraction experiments, and the inability to concentrate as a complex-sign.

(14) Practice.—Wells summarizes the practice effects as follows: (a) They tend to decrease the association time. "Practice shortens the central tendencies of the times, it does not bring down their lower limit very much,"—that is, practice does not affect the most rapid reactions. (b) They tend to remove certain inhibitions, the vocabulary of the subject becoming more available. (c) They tend to decrease the emotive value of the experiment. As a result, this element reduces the value of the association method for complex-diagnosis.

II THE ASSOCIATION SERIES WITH REPRODUCTION

(1) "*Wiederholungsversuch*" (Recall of Response) (Jung)

This procedure was first used by Jung and was based on the phenomenon of repression (*Verdrängung*). Since individuals attempt to repress and forget those thoughts and experiences which are out of harmony with prevailing moral and aesthetic concepts, consequently those stimulus words related to any disagreeable, unpleasant or offensive acts or ideas, will not elicit the same response when the identical experimental series is again given.

Jung's method was as follows: He first constructed the regular series of 100 words to which the subject responded. The reaction, both qualitative and quantitative, was noted. After a moderate interval (the following day), the subject was again told to react to the same series, and as far as possible, with exactly the same words. This time only the verbal response was noted. (In Pfenninger's reproduction experiments, the same series was given at eight weekly intervals.) A comparative estimation of results proved that the reactions to words related to a complex were not the same in both cases.

Lipmann found it difficult to estimate failures of reproduction when a synonym or an approximately similar word was given as the second response. In such instances, the number of other coincident complex-indicators ought to be used as a criterion in deciding. Jung, Pappenheim and Peters have shown that false reproduction and long reaction times occur together most remarkably. Schnitzler, however, observed a negative correlation. Langfeld, working on the problem of negative instruction, the subject avoiding one type of response in preference to another, proved that under these conditions the failure of reproduction went as high as 26%.

(2) "*Erinnerungsversuch*" (Recall of Stimulus) (Wertheimer, Lipmann).

First, the association series is given. The response and reaction time are noted. The "*Wiederholungsversuch*" described in the last section, may or may not follow, it being optional with the examiner. After a reasonable interval, the subject is asked to recall, in any order, as many of the stimulus-words as possible. These are recorded. Lipmann finds that the larger percentage of words remembered will be complex-toned, and that the first words recalled may be of great significance in diagnosis. The repetitions during recall are important,—these also should be recorded. During reproduction, if words appear which were not present in the regular series, a close examination may reveal the relation to the complex of both the incorrectly reported word and the forgotten stimulus. Lipmann remarks that this "*Erinnerungs*" procedure may result in the subject's gathering together the scattered complex-stimuli in such an order, that the sequence of ideas may almost amount to a voluntary confession.

III THE "AUSSAGE" OR REPRODUCTION METHOD

IV THE "AUSSAGE"-ASSOCIATION METHOD

V THE COMBINATION METHOD

In these experiments, the examiner assumes that the subject has had a specific, vivid, emotionally-toned experience. He is then read a story ("*Versuchsgeschichte*") so constructed by the experimenter as to be very similar in content to the experience in question. The details in the narrative, however, are incomplete, vague and only cleverly approximate the actual events. Having been instructed to pay strict attention, the subject is requested to recall as much of the story as possible. But the details in the narrative and experience being so much

alike, he more or less unconsciously confuses those of one with those of the other, and, as a result, inserts and supplements items which were wholly absent from the story. By this intimate knowledge of details, he easily betrays his familiarity with certain events. He may have previously denied most emphatically the least acquaintance with a single incident. Nevertheless, his responses definitely point to the contrary.

III *The "Aussage" or Reproduction Method.* (Wertheimer.)

This procedure is not to be confused with Jung's. The individual here is asked to reproduce orally the story which had been read to him. Using the technical terms of the "Aussage" Test, this portion of the method is the "Bericht" or report, and may be further supplemented or completed by the "Verhör" (the interrogatory or deposition). The latter may be any one or a combination of these three types. First, the questions may relate to details only, which are *common* to both story and "Tatbestand" (experience, or constellation of facts); second, the questions may yield different responses owing to *differences* in story and "Tatbestand"; third, the questions may relate to details present only in the "Tatbestand." Kramer states that this method may work perfectly in the laboratory, but may fail absolutely in actual application. More data are necessary.

IV *The "Aussage"-association Method.* (Wertheimer.)

Here the subject is given an association series made up of words of these three types: first, those relating to similarities in both the "Tatbestand" and the story; second, those relating neither to the "Tatbestand" nor the story; third, those relating only to the "Tatbestand." The subject is requested to state his associations only to those words which appeared in the story; to all others he is to respond with the word, "nothing." According to Lipmann the guilty easily betray themselves.

V *The Combination Method.* (Lipmann and Wertheimer.)

The following is Lipmann and Wertheimer's adaptation of the Ebbinghaus "Kombinationsmethode." After the subject has heard the "Versuchsgeschichte," a sheet is placed before him containing the text of the story, but from which many details have been omitted. Room is left in the "Kombinationstext" for the proper information to be inserted. This

information (not having been given at all in the story) either must be supplied from the "Tatbestand," or else the text is so arranged as to draw out more or less forcibly a complete description of some incident inaccurately mentioned in the narrative.⁸

Apparatus is arranged so that whenever the subject writes, an electric circuit is closed. It is opened the moment the pencil leaves the paper. A kymograph is used to record these "makes" and "breaks" of current. Long, significant pauses may thus be recorded and the correlations between length of pause and character of the supplementation noted. Attempts at dissimulation are easily discovered, first, by a too frequent response of "Nothing"; second, by too many unmeaning reactions; third, by a greatly retarded reaction procedure. At the end of the experiment, Lipmann and Wertheimer had their subject give an introspective account of his mental activity during the examination. Many of those who were found to have betrayed themselves, were most positive in their insistence that they had said nothing which could in any way reveal the existence of the complex. Rittershaus sees no value in this method.

In all of the three above procedures, it is admitted that innocent as well as guilty individuals will make errors in their reproductions. The point to be emphasized, however, is that the guilty make *significant* ones.

VI *Perception Method.* (Wertheimer and Klein.)

Optic stimuli are presented by means of a tachistoscope. The exposure is made for a very short time. The association series includes (a) purely irrelevant words, (b) complex-words, (c) irrelevant words similar by sight or sound to those of a complex type, (d) incomplete words which might be interpreted by the subject either as irrelevant or complex, e. g.,—CHO-E may be interpreted in terms of the complex as CHOKe, or may be understood by the innocent individual as CHORE or CHOSE.

Results seem to indicate that (a) so-called guilty individuals perceive complex stimuli more quickly than irrelevant, (b) irrelevant stimuli are falsely perceived as complex, (c) incom-

⁸ Max Verworn suggests a graphic method whereby an individual is shown a drawing similar in detail to the place where, let us say, a crime was committed. The drawing is not quite accurate. The suspect is asked to reproduce the drawing from memory. The errors may be very significant.

plete stimuli are interpreted more easily as complex than irrelevant.

Instead of perception being visual, it may be auditory. The authors suggest Gutzmann's procedure in the use of a phonograph. Thus the word *coarse* will be heard as *corpse* by the murderer. Some of the advantages in using a phonograph have already been indicated. Besides the ones mentioned, the phonograph adds obscurity and indistinctness to the stimulus, and eliminates any possibility of lip-reading.

VII *Distraction Method.* (Wertheimer and Klein.)

The subject is given two texts, the content of one being related to the "Tatbestand," while the content of the other is quite irrelevant. He is requested to put a line through all "r's" as rapidly as possible. The number of "r's" crossed, the time, errors, and behavior are noted. The results seem to show that the meaning of the text relating to the "Tatbestand" is much more distracting to the rigid and accurate performance of the task.

VIII *Sentence Method.* (Moravcsik.)

The experimental material consists largely of sentences expressive of different emotional states. Sentences of indifferent affective toning are also employed. The subject is requested to respond with whatever comes into his mind. No attempt is made to narrow down the reaction to any particular form, type or to any number of words. Moravcsik experimented only on melancholiacs and maniacs. The following are samples of his material:

- Stimulus *Words* (depression)—sadness, pain, suffering, grave, sins.
 (exaltation)—joy, riches, dance, laughter.
 (indifferent)—garden, house, snow.
Sentences (depression)—How unfortunate I am!
 It would be well if I were buried.
 My heart is so full of pain.
 (exaltation)—The best thing is a long life.
 I am full of joy!
 (indifferent)—In Winter the snow falls.

He observed that the melancholiac found a group of words expressive of dejection harmonious and desirable, and revolted to those of an exalted type. The reverse was true of the maniac. He also concludes that those possessing a stronger mental balance answer with a single word rather than with a sentence.

IX *The "Ausfrage" Method.* (Marbe, Messer, Bühler and others. Designated "Ausfrage" by Wundt.)

The procedure is that of the simple association experiment. A stimulus word is presented and the subject responds with the first idea coming to consciousness. Immediately following this, however, he is asked to give a complete introspection of all his mental operations during the reaction. This method is of value only where trained introspectionists are acting as subjects. Wundt opposed its use as a psychological experiment, since it lacks the four necessary elements, but Kakise, on the contrary, makes a strong plea for its employment. From one point of view this mode of procedure resembles greatly the usual psychanalytic method.

Since some of these methods have only in one or two cases been given a fair and accurate trial by unbiased yet expert psychometrists, for the detection of crime, it is not surprising to find so large a number of workers in this field skeptical as to their value. We certainly need more data. But, granting their worthlessness for criminal psychology, they still are of great promise to experimentalists interested in the diagnosis of individual complexes and constellations. As yet, the procedures are crude and the technique undeveloped. The methods are waiting for a master-hand at reconstruction and improvement.

G THE COMPLEX INDICATORS ("KOMPLEXMERKMALE")

In the earlier association experiments, deviations, peculiarities, errors in response were not regarded as significant. And even to-day, unless one is well acquainted with the more recent contributions in this field, one may be led to commit many farcical errors, such, for example, as those of Schnitzler. During his experiments, any stimulus word not properly understood by the subject was eliminated from the series and another similar one was substituted! This occurred in all cases at least once, and was as frequent as five or six times!! One is naturally led to conclude either that the examiner was very careless in his choice of words or in his pronunciation of them, or that his subjects were peculiarly defective in hearing, or what is more probable and evident, that he seriously neglected observing the importance of failures to hear or understand, especially as to their relation to the complex for which he was searching. On the contrary, an efficient examiner ought to look suspiciously upon every unnatural or forced laugh, cough or movement.

In this connection, it might be advisable to emphasize most strongly the fact that *one* complex-sign by itself should never be regarded as diagnostic. One may venture a judgment only when in possession of an *aggregate* of indicators. Then again, common sense must be used in determining the importance of the several symptoms. Kramer and Stern have observed that different individuals betray their complexes in different ways. Consequently the importance of the separate "Komplexmerkmale" will be differently graded for various persons. Also, A. Gross, Löffler, Kramer and Stern and Rittershaus all emphasize the danger of rendering interpretations on the basis of minutiae. To quote Löffler, "What cannot be grasped with the hands, ought to be let alone." ("Was nicht mit Händen zu greifen ist, lasse man beiseite.")

Among the skeptics is Heilbronner, who maintains that the large number of complex-symptoms leads to inaccuracies, since to the experimenter with foresight, it is overwhelming, while for one who is careless, it means arbitrariness and caprice. He has no faith in conduct being used as a complex-sign, and believes that the existence in all persons of numerous complexes renders a separate diagnosis very difficult. Rittershaus seems to regard the last criticism as a very telling one. In actual experimentation, however, where one obtains some sort of verbal response, which may later be analyzed by a question or two, the difficulty is not as serious as it is made to appear.

The "Komplexmerkmale" may be classified roughly into three types,—qualitative, quantitative, physiological.

I *Qualitative Complex Indicators*

(1) *Content.*

A subject may often help indicate the existence of specific constellated mental material by giving a response-word of significant meaning.

(2) *Whispered Response.*

A stimulus word disturbing the usual calm of mental activity may call forth a whispered response.

(3) *Failure to Understand.*

The stimulus word is really not misunderstood, but, due to the activity of the "censor" the subject has a strong desire *not* to understand. In one case, Jung found the following to have been misunderstood: hate, love, remorse, failure, pleasant. All were related to a definite complex.

(4) *False Reproduction.* ("Wiederholung.") (Responses.)

This phenomenon has been explained earlier in the paper. The reproduction may occur after a short interval (Jung), or after a series of weekly intervals (Pfenninger). In one of Stein's cases (a woman forger), 44% of her reactions were falsely reproduced. Pfenninger has demonstrated that those stimulus words which during the first experiment, gave rise to no complex signs whatever, showed changes in reproduction (after eight intervals, a week apart), amounting to 2.6 for men, 1.6 for women. Where there was but one complex-sign (lengthened reaction time), the changes amounted to 3.3 for men, 2.4 for women. Where there were more than this one complex indicator, the changes amounted to 4.5 for men, 1.7 for women. He concludes that the greater the number of complex-signs possessed by a stimulus word, the larger will be the number of failures in reproduction; and vice versa, the greater the number of failures in reproduction, the greater will be the number of complex-signs attaching to a stimulus.

(5) *False Recall.* ("Erinnerung.") (Stimuli.)

The subject here is asked to recall the stimulus words in any order. Two types of individuals may be observed, one who tries to keep from betraying himself, and will avoid recalling very many, if any, significant words; the other type, more free and open, who will recall complex-stimuli more rapidly and in larger proportion than insignificant stimuli.

(6) *Perseveration.*

(a) Response.

Sometimes no apparent nexus is observable between stimuli and a certain kind of response which appears more or less frequently throughout the experiment. This disposition has been given the name "perseveration tendency" ("Perseverationstendenz."—Müller-Pilzecker). Perseveration may be due to the presence of a complex or a constellation which dominates consciousness, or to a marked poverty of ideas, or the cause may lie deeper in the psychophysical mechanism. Swo-boda emphasizes the importance of regular periods of time upon the recurrence of ideas. One of Jung's subjects showed a perseveration of 5%. On examination, the words were all found to be related to the oppressive heat of the day. Of the repeated responses, two were "snow," and two "perspire." Perseveration may occur because of an impulse to avoid creating a "vacuum," or to break down one already existing.

(b) Stimulus.

A subject may sometimes use some significant stimulus word which appeared earlier in the experiment as the response for succeeding stimuli. Perseveration in this case may be due to any one of the reasons mentioned under the preceding heading.

(c) Affect.

Sometimes the perseveration of an affect may be noted. In such cases, the reaction times are increased. (See Post-critical Responses.) On the contrary, Schnitzler observes that affective perseveration shortens reaction times.

(7) *Inhibition.*

Some trains of thought are inhibited by the subject for reasons of modesty, privacy, fear, shame. Any response bringing these uncomfortable ideas into consciousness is checked, with a resulting increase in reaction time.

(8) *Failure to Respond.*

Aside from explaining that failures to respond may be produced by an "emotional stupidity," Jung states that the failures may be due either to hindrance of verbal expression because of the presence of vivid visual imagery, or of vivid ideas strongly tinged with emotion; or they may be due to a distinct eroticism. Sutherland seriously attacks Jung's explanation. First, he takes exception to the statement, "I call attention to the fact that it is quite indifferent what reason the test person gives for refusal to react"; and secondly, he gives the following as some of the true reasons for failures: unpreparedness, meaning recognized and inhibited, attention focussed on irrelevant matters, meaning not recognized, stimulus misunderstood, no meaning to the stimulus, in doubt of word, ambiguity of stimulus, copious imagery, fascinating visual imagery, voluntary inhibition, articulatory block, competition of reaction words, motor block, absorption in trains of imagery, reverie, dreamy, blank. In summing up, he says, "A satisfactory explanation of the failure to react involves a genetic study of each particular case; that a considerable number of factors is or may be responsible for each failure; that many of these factors may be peculiar to the experimental situation. The failure indicates the previous experience of the individual only in a very general manner, and is apparently

not sufficiently specific to use confidently for purposes of diagnosis." It is a bit unfortunate that Sutherland chose so many words which tended naturally to increase the normal number of failures.

In one case, Jung observed that the following words produced failures to react: caress, sick, suffer, kiss.

(9) *Quotations.*

(10) *Titles.*

(11) *Sentences.*

A stimulus may give rise to a mental state which can best express itself by means of a quotation, the title of a book, of a story, or a sentence from a song or poem. It is held by some that this is done in order to veil a secret thought. Jung explains that similarly people often sing songs and tell stories which give an intense secret pleasure, because they contain an idea, or give rise to a feeling which cannot openly be expressed.

(12) *Symbolism.*

A word may sometimes be given in response which possesses a separate, individual meaning for the subject, and acts as a symbol representative of a complex.

(13) *General Concepts Hiding the Meaning.*

What appears as an unimportant, general concept may in reality be only a cloak for some specific complex. For example, Jung cites the case of a young lady to whom he presented the stimulus, "three." The response was, "friends." The subject's later statements made it manifest that she had been painfully disillusioned by three of her intimate friends.

(14) *Addition of the Article.*

For example, "angry"—"the person." "*The person*," in this case, meant the subject's irritable father who severely objected to her relations with the young man she loved.

(15) *Naming of an Object in the Examiner's Room.*

Thinking it inadvisable to express a complex-reaction-word, an individual may begin a search for a substitute. His eyes, wandering about the room, may suddenly light upon some object, whose name he immediately proceeds to use as a surrogate-response.

(16) *Peculiar Form of the Response.*

In order to avoid a direct reply with a consequent betrayal of a complex, a person may sometimes be observed to respond with a phrase, a few incoherent or unrelated words.

(17) *Unusual Response.*

A word which is but seldom given as a response may be regarded as suspicious, and indicative of the existence of a constellation or a complex.

(18) *Errors in Response.*

Since the complex is absorbing the complete attention of the subject, all sorts of errors are liable to occur when attempting to respond to an "alien" stimulus.

(19) *Assimilation.*

Because of the subject's different apperceptive attitude, he gives a *new* and *unusual* meaning to the stimulus word.

(20) *Vacuum.*

The explanation and description of this condition have already been briefly mentioned above.

(21) *Unmeaning Responses.*

These may be of two forms, (a) the qualitative relations between a stimulus and a response are of an unmeaning or senseless character, (b) the response itself is without meaning. Rhymes and sound (Klang) associations are examples of unmeaning reactions.

(22) *Nonsense.*

Here are included those slightly irrelevant responses possessing the merest touch of humor perceptible to the examiner only.

(23) *Incomplete Responses.*

Now and then a subject may react by giving only part of a word or phrase. These "errors" should always be recorded and their relations to the complex closely scrutinized.

(24) *Supplementations of Stimulus Words.*

This activity, especially if more or less frequent, may be regarded as suspicious.

(25) *A-symmetrical Responses.*

The stimulus word, usually of double meaning, is not interpreted in its customary sense. For example, "Aussicht" means both "view" and "appearance;" the stimulus word "mean" may be interpreted by the subject as any of the following: arithmetical average, purpose, import, vulgar, paltry, contemptible, and so on. The complex or constellation generally determines which one of these is to be perceived. Homonyms may also be included under this head,—fair, fare; crews, cruise; muscle, mussel; tare, tear.

(26) *Post-critical Responses.*

Post-critical reactions are those immediately following a critical response. Various experimenters have observed that an emotion may have a post-critical effect, tending usually to increase the reaction time. Heilbrunner goes further by maintaining that not only are the next few responses affected by this perseveration, but all of the remaining experiment is absolutely changed. Only a very small number, however, regard this criticism as serious.

(27) "*Versprechen*," "*Verhören*," ("*Verlesen*.")

The importance of arranging some stimuli so as to be incorrectly perceived, has already been discussed elsewhere. Examples of "Verlesen" (misread) are, (German) "Mord" for "Mond," (English) "kill" for "hill;" "Verhören" (mishear), (German) "Molch," "Dolch" or "Stolch" for "Olch;" (English) "die" for "buy," "truth" for "truce," "filth" for "fills," "father" for "farther," "arms" for "alms." As for "Versprechen" (misspeak), the Freudians have adequately emphasized its significance for complex-diagnosis. In any of these mechanisms the error may be wilful or unconscious. Also, the response-word may be directly related to the complex or may be the expression of a wish that the stimulus word were different.

(28) "*Komplexvertreter*." (*Complex-surrogate*.)

In such cases the subject keeps one word, usually, in reserve, in order to substitute it for complex-responses. Wells cites a

case. To the words "useless," "husband," "honor," and "against," the response in each instance was "word." This was accompanied every time by a long reaction period. On the basis of other evidence, however, he denies that this is a true example of "Komplexvertreter."

(29) *Translations.*

To avoid giving a suspicious response, an individual may not infrequently translate the stimulus into a different language. Sometimes the reaction word is expressed in a foreign tongue.

(30) *Interjections or Single Letters.*

These are sometimes uttered as response words. In most cases, one is safe in regarding them as suspicious.

II. *Quantitative Complex Indicator*

The quantitative complex indicator is the reaction time. The reaction time is usually regarded as the interval between the giving of the stimulus word (the stop-watch or chronoscope being started on the accented syllable), and the pronouncing of the reaction word.

This general reaction time is composed of seven or eight subdivisions. Ziehen, Claparède and Jung have attempted to clearly distinguish these—thus:

(1) The time of transfer of the sound to the ear of the subject,

(2) the transfer from the periphery to the auditory center,

(3) the recognition of the word,—what Jung calls "primary identification,"

(4) the understanding of the word,—called by Jung, "secondary identification,"

(5) the calling forth of another idea (this is really the *pure* association),

(6) the naming of this idea in consciousness,

(7) the inner stimulation of the verbo-motor apparatus (and if a key is to be pressed, also a stimulation of the motor centers controlling hand movements),

(8) the time between this stimulation and expression.

The gross reaction time has been found to be:

Aschaffenburg's figures.....	1.2 to 1.4 seconds
Galton's figures.....	1.3 seconds
Trautscholdt's figures.....	0.9 to 1.2 seconds
Féré's figures	1.6 for men, 1.8 for women
Jung's (already mentioned).....	1.8 average.

According to Jung, a 0.5-second variation over the average may be regarded as suspicious. That is probably too short an allowance,—one second is probably better.

It is generally agreed that the stop-watch is, from many points of view, the better instrument with which to measure association time.

III. *Physiological Complex Indicators*

The physiological complex indicators will merely be mentioned, since, as yet, we know but little of their value as practical instruments for the detection of complexes. It is at present assumed that unusual changes produced in any of the following, by the perception of a stimulus word, may be diagnostic of a complex:

- (1) *Psychogalvanic Reflex.*
- (2) *Electro-motor Heart Flow.*
- (3) *Pulse.*
- (4) *Respiration.*
- (5) *Blood Pressure.*
- (6) *Involuntary Movements, or Tremors of the Hands or the Limbs.*
- (7) *Ataxiagraph. (Involuntary Bodily Sway.)*
- (8) *Knee-jerk.*
- (9) *Lifting Ability of the Finger. (Ergograph.)*
- (10) *Tapping Test.*
- (11) *Strength of Grip.*
- (12) *Facial Expression. (Reddening, etc.)*
- (13) *Tone of Voice in Response.*
- (14) *Ability to Concentrate. (Disturbances of Attention.)*
- (15) *General Conduct and Behavior. (Coughing, Clearing the Throat, etc.)*

* * * * *

It is generally admitted that a large number of the complex-indicators mentioned above may be purely accidental and without any complex-significance whatever. For example, a person with a cold in the head may not hear very well, he may give a wrong response, may make some unusual, restless movements, may cough here and there, and tears even may begin to flow from his eyes. The experimenter cannot be too careful in discriminating a forced, artificial behavior from a purely natural one. Unless one is heedful of this fact, most absurd results may be obtained.

The complex-indicators have not been arranged in order of importance, for as previously mentioned, each individual has

an order of his own. Rittershaus emphasizes the fact that since uneducated possess a much smaller vocabulary, they may give longer reaction times when presented with slightly strange words; that, coming from a lower level, they are not accustomed to think in single words or ideas, but in sentences, and that they often approach the examination as a kind of intelligence test, thinking that they must under no circumstances give anything but an intelligent answer. In such cases, it is not surprising to observe failures to respond, lengthening of reaction times, false reproductions, sentence responses, etc. These complex-indicators are of practically no significance in their cases.

The experimenter should try to observe as many symptoms as is possible without interfering in any way with the mental composure of the subject. For that reason, too much apparatus in the detection of physiological complex-indicators is not advisable.

Rittershaus' experimental procedure might be mentioned here. There are four experimenters: the first gives the association series and records the reaction word and the time; the second has a copy of association material and sits a little on the side, paying particular attention to the behavior of the subject, noting any physiological changes or changes in behavior; the third is a disinterested individual who is not present during the examination. After it is over, he takes the results and works them into curve form; and the fourth is one who knows nothing of the particular subject tested, and is ignorant of all direct experimental data. He studies the curve and draws his conclusions from it regarding the existence of complexes. When that is done, all get together and talk it over.

Before the experimenter can feel properly qualified to evaluate results, he must have had a wide experience in applying this method to different types of normal adults, to children, to feeble-minded, and to insane. To quote Jung: "The association method is a tender instrument which can only be directed by the experienced hand, and one must pay dearly for his experience before the application of this method is accurately understood. Consequently, as it now stands, one must not expect too much; it is, however, full of great possibilities."

H. CONCLUSIONS

I. *Pedagogical*

Ziehen places strong emphasis upon the fact that experimental studies of association are necessary for a scientific pedagogy. This matter has been reiterated by Meumann.

Pfister clearly indicates the relation of the complex to the hygiene of the school child. A number of psychoanalysts are now studying the complex as a moulder of character, and as a determiner of the future.

From the data already considered, we may infer the following:

(1) Every one of us possesses a different mass of associated complexes. In the school room, consequently, an explanation to one will have an entirely different meaning to another pupil.

(2) Education fixes certain associations between ideas. These associations are not easily broken down. Sometimes they persist for the whole life-time of an individual. What great care and caution must be exercised by the teacher!

(3) Galton has shown that the largest part of our associations are "histrionic," of the motor or visual type. For that reason, it should be emphasized that the greater the amount of objective experiences obtained by the child, the better equipped will he be later. These experiences should be not only perceptive, but also *affective*. Ziehen and Meumann found that children between six and thirteen who gave a larger per cent. of "individual vorstellungen" (particular ideas), were the brighter. These particular ideas naturally give the child a sound basis on which to build his abstractions.

(4) Galton also pointed out that nearly 50% of our oft-repeated associations date back to childhood and youth. How important is it then, to fill the mind of that period with rich, numerous, and concrete associations.

(5) The emotions greatly affect the facility of associations. Pleasant emotions help, unpleasant ones retard, the process. Consequently, our aim in education should be for pleasurable feelings all the time, in order to facilitate the acquisition of knowledge. "Happiness first,—all else follows," to quote the Vineland motto.

(6) Emma Fürst has shown how the association complexes of the family have an enormous directing effect upon the formation of complexes in the children. The family constellations (what Jung calls the "infantile milieu") have an enormous effect upon the character formation of the child.

Adler has clearly emphasized the importance of the "manly protest" at the dawn of puberty. At that period a most significant revolution, both mental and physical, is going on in the individual. The spirit and desire for freedom, for self-expression, are raging in the entire organism. Consequently, a child who is bound down by, and too much dependent upon the family and its members, may suffer serious mental injury.

(7) Children's questions ought to be given more earnest consideration. Our treating their every inquiry as a matter for mirth is absolutely unjust. Truth and seriousness ought to prevail instead.

(8) If the Freudian concepts of infantile sexuality are true, then we may hopefully look to psychoanalysis not only as the most essential neurotic prophylactic, but also as a most important factor in determining the directions in which personality is expected to develop. As regards the first, Pfister already has indicated how certain abnormalities in school children may be psychoanalyzed and removed.

II. *Psychological*

If the psychology of character has a future then the search for complexes is going to play an enormous part in its development. At present, we have not advanced very far beyond the classification of the temperaments. In Wundt's psychology, the four-fold arrangement of the Greeks still persists. Other classifications have been suggested by Dessoir, Bahnsen, Höffding, Ebbinghaus, Ribot, Kraepelin, Binet and a large number of others, but they are all purely theoretical. And one is painfully astonished to note in a recent German article on personality, but one(!) reference to the work of a psychoanalyst among 130 others. "Komplexlehre" was entirely neglected in this study.

The usual definition of character focusses on the term "expression," but a new definition, in the light of complex and constellation studies, will go back to the *motives* for this "expression." The one is objective, the other subjective.

Sutherland has indicated that trains of association are very significant for (1) information regarding the condition of mentality—normal or abnormal; (2) range of information in any particular subject; (3) logical sequence of the thought processes.

Further research in this extensive field of the complex will no doubt reveal the closer union between psychology and eugenics. Are the tendencies to acquire certain particular complexes hereditary? Are complexes, as such, hereditary? The studies of Emma Fürst seem, on the surface, to give a positive answer to at least the first question.

In closing this paper, I cannot but emphasize the importance of the complex and the constellation as factors shaping our destinies, and the importance of the association method in determining what these complexes and constellations are.

J. BIBLIOGRAPHY

1. APTEKMAN, ESTHER. Experimentelle Beiträge zur Psychologie des psychogalvanischen Phänomens. *Jahrb. f. Psychoanalyt. u. psychopatholog. Forschgn.*, III., 1912, 591-620.
2. ASCHAFFENBURG, GUSTAV. Experimentelle Studien über Assoziationen. Kraepelin; *Psycholog. Arbeiten*, I, 1896, 209-299; II, 1899, 1-83; IV, 1904, 235-373.
3. ATHERTON, M. VALERIE and WASHBURN, M. F. Mediate Associations Studied by the Method of Inhibiting Associations: An Instance of the Effect of "Aufgabe." *Amer. J. Psychol.*, XXIII, 1912, 101-109.
4. BAWDEN, H. A Study of Lapses. *Psychol. Rev. Mon. Supp.*, III, 4, 1900, 122 p.
5. BINET, ALFRED. Le diagnostique judiciaire par le méthode des associations. *Année psychol.*, XVI, 1910, 372-383.
6. BINSWANGER, L. Über das Verhalten des psychogalvanischen Phänomens beim Assoziations experiment. Jung: *Diagnos. Assoziationsst.*, II, 1910, 113-195; also *J. f. Psychol. u. Neurol.*, X, 1907-1908, 149-181; XI, 1908, 65-95, 133-153.
7. BIRNBAUM, KARL. Über den Einfluss von Gefühlsfaktoren auf die Assoziationen. *Monatsschr. f. Psychiat. u. Neurol.*, XXXII., 1912, 95-123; 194-220.
8. BLEULER, E. Über die Bedeutung von Assoziationsversuchen. Vorwort; *J. f. Psychol. u. Neurol.*, III, 1904, 49-54; also Jung; *Diagnos. Assoziationsst.*, I, 1906, 1-6.
9. ———. Bewusstsein und Assoziation. *J. f. Psychol. u. Neurol.*, VI, 1905-1906, 126-154; also Jung; *Diagnos. Assoziationsst.*, I, 1906, 229-257.
10. BOLTE, ———. Assoziationsversuche als diagnostisches Hilfsmittel. *Allg. Zschr. f. Psychiat.*, LXIV, 1907, 619-630.
11. BRILL, ABRAHAM ARDEN. *Psychoanalysis; its theories and practical application.* Phila. and London, W. B. Saunders, 1913. 337 p.
12. BURR, EMILY T. and GEISSLER, L. R. An Introspective Analysis of the Association-Reaction Consciousness. *Amer. J. Psychol.*, XXIV, 1913, 564-569.
13. CHASE, HARRY WOODBURN. *Psychoanalysis and the Unconscious. Ped. Sem.*, XVII, 1910, 281-327.
14. CLAPARÈDE, ED. *L'Association des idées.* Paris: Doin, 1903, 426 p.
15. ———. La psychologie judiciaire. *Année psychol.*, XII, 1905, 295-302.
16. CORDES, G. Experimentelle Untersuchungen über Assoziationen. *Philos. Stud.*, XVII, 1901, 30-77.
17. FÉRÉ, CHARLES. *The Pathology of the Emotions.* London: University Press, 1899, 525 p.
18. FRANZ, S. I. and WHITE, W. A. The Use of Association Test in Determining Mental Contents. U. S. Gov. Hos. for the Insane. *Bull.* I, 1909, 55-71.
19. FREUD, SIGMUND. Tatbestandsdiagnostik und Psychoanalyse. *Arch. f. Kriminalanthropol. u. Kriminalistik*, XXVI, 1906, 1-10.
20. ———. Zur Psychopathologie des Alltagslebens. Berlin: Karger, 1907, 132 p.

21. ———. Tatbestandsdiagnostik und Psychoanalyse. In Sammlung kleiner Schriften zur Neurosenlehre. Leipzig u. Wien: Deuticke, II, 1909, pp. 111-121.
22. ———. The Origin and Development of Psychoanalysis. *Amer. J. Psychol.*, XXI, 1910, 181-218.
23. ———. Über Psychoanalyse; fünf Vorlesungen gehalten zur 20 jährigen Gründungsfeier der Clark University in Worcester, Mass., Sept., 1909. Lpz.: Deuticke, 1910, 62 p.
24. FÜRST, EMMA. Statistische Untersuchungen über Wortassoziationen und über familiäre Übereinstimmung im Reaktionstypus bei Ungebildeten. *J. f. Psychol. u. Neurol.*, IX, 1907, 243-278, also Jung: *Diagnos. Assoziationsst.*, II, 1910, 77-112.
25. GALLUS, KURT. Über Assoziationsprüfung. *Zschr. f. Psychother. u. mediz. Psychol.*, II, 1910, 106-127.
26. GALTON, FRANCIS. Psychometric Experiments. *Brain*, II, 1879, 149-162, also *19th Century*, V, 1879, 425-433.
27. ———. Inquiries into Human Faculty and its Development. London: MacMillan & Co., 1883, pp. 182-203.
28. GEISSLER, L. R. A preliminary Introspective Study of the Association-Reaction-Consciousness. *Amer. J. Psychol.*, XXI, 1910, 597-602.
29. ———. Analysis of Consciousness under Negative Instruction. *Amer. J. Psychol.*, XXIII, 1912, 183-213.
30. GIESE, FRITZ. Das Ich als Komplex in der Psychologie. *Arch. f. d. ges. Psychol.*, XXXII, 1914, 120-165.
31. GRABOWSKY, ADOLF. Die Anwendung der psychologische Tatbestandsdiagnostik in der Strafrechtspraxis. *Monatsschr. f. Kriminalpsychol. u. Strafrechtsref.*, III, p. 163.
32. ———. Zur Frage der psychologische Tatbestandsdiagnostik. *Zeitschr. f. d. ges. Strafrechtswiss.*, XVI.
33. GROSS, A. Zur psychologischen Tatbestandsdiagnostik als kriminalistisches Hilfsmittel. *Beitr. zur. Psychol. der Aussage*, II, 1904-1906, 436-439.
34. ———. Zur psychologische Tatbestandsdiagnostik. *Monatsschr. f. Kriminalpsychol. u. Strafrechtsref.*, II, 1905, 182-184.
35. ———. Die Assoziationsmethode im Strafprozess. *Zeitschr. f. d. ges. Strafrechtswiss.*, XXVI, 1905, 19-40.
36. ———. Kriminalpsychologische Tatbestandsforschung. *Jurist.-psychiat. Grenzfr.*, VII, 1907.
37. ———. Zur Frage des Wahrnehmungsproblems. Ref. in *Beitr. zur Psychol. der Aussage*, II, 1904-1906, 258-264.
38. GROSS, H. Zur psychologische Tatbestandsdiagnostik. *Arch. f. Kriminalanthrop. und Kriminalistik*, XIX, 1905, 49-59.
39. HAGGERTY, M. E. and KEMPF, E. J. Suppression and Substitution as a Factor in Sex Differences. *Amer. J. Psychol.*, XXIV, 1913, 414-425.
40. HEILBRONNER, KARL. Die Grundlagen der psychologische Tatbestandsdiagnostik. *Zschr. f. d. ges. Strafrechtswiss.*, XXVII, 601.
41. HENKE, F. G. and EDDY, M. W. Mental Diagnosis by the Association Reaction Method. *Psychol. Rev.*, XVI, 1909, 399-409.
42. HUBER, EDWIN. Assoziationsversuche an Soldaten. *Zschr. f. Psychol. u. Physiol. d. Sinnersorgane*, LIX, 1911, 241-272.

43. HUG-HELLMUTH, H. VON. Aus dem Seelenleben des Kindes, eine psychoanalytische Studie. Lpz.: Deuticke, 1913, 170 p. (Schriften zur angew. Seelenkunde, Heft. 15.)
44. JELLIFFE, SMITH ELY. The Technique of Psychoanalysis. *Psychoanalytic Rev.*, I, 1913-1914, 63-75; 178-186; (to be continued).
45. JONES, ERNEST. The Practical Value of the Word-Association Method in the Treatment of the Psycho-Neuroses. *Rev. of Neurol. and Psychiat.*, VIII, 1910, 641-672.
46. ———. Papers on Psychoanalysis. London, Baillière, 1913, pp. 206-240.
47. JUNG, CARL G. Über Simulation von Geistesstörung. *J. f. Psychol. u. Neurol.*, II, 1903, 181-201.
48. ———. Experimentelle Beobachtungen über das Erinnerungsvermögen. *Centralbl. f. Nervenheilk. u. Psychiat.*, XXVIII (n. s. XVI), 1905, 653-666.
49. ———. Zur psychologischen Tatbestandsdiagnostik. *Centralbl. f. Nervenheilk. u. Psychiat.*, XXVIII (n. s. XVI), 1905, 813-815.
50. ———. Analyse der Assoziationen eines Epileptikers. *J. f. Psychol. u. Neurol.*, V, 1905, 73-90, also Jung: *Diagnos. Assoziationsst.*, I, 1906, 175-192.
51. ———. Über das Verhalten der Reaktionszeit beim Assoziations experimente. *J. f. Psychol. u. Neurol.*, VI, 1905-1906, 1-36, also Jung: *Diagnos. Assoziationsst.*, I, 1906, 193-228.
52. ———. Psychoanalyse und Assoziations experiment. *J. f. Psychol. u. Neurol.*, VII, 1905-1906, 1-24, also Jung: *Diagnos. Assoziationsst.*, I, 1906, 258-281.
53. ———. Die psychologische Diagnose des Tatbestandes. *Jurist.-psychiat. Grenzfr.*, IV, 1906.
54. ———. On Psychophysical Relations of the Associative Experiment. *Abnorm. Psychol.*, I, 1906-1907, 247-255.
55. ———. Assoziation, Traum und hysterisches Symptom. *J. f. Psychol. u. Neurol.*, VIII, 1906-1907, 25-60, also Jung: *Diagnos. Assoziationsst.*, II, 1910, 31-66.
56. ———. Literaturbericht (O. Lipmann und M. Wertheimer: Tatbestandsdiagnostische Kombinationsversuche). *Zschr. f. Psychol. u. Physiol. d. Sinnesorgane*, L, 1909, 301.
57. ———. Über die Reproduktionsstörungen beim Assoziations experiment. *J. f. Psychol. u. Neurol.*, IX, 1907, 188-197, also Jung: *Diagnos. Assoziationsst.*, II, 1910, 67-76.
58. ———. The Association Method. *Amer. J. Psychol.*, XXI, 1910, 219-269.
59. ———. The Theory of Psychoanalysis. *Psychoanalytic Rev.*, I, 1913-1914, 1-40; 153-177; to be continued.
60. JUNG, CARL G. und RIKLIN, FR. Experimentelle Untersuchungen über Assoziationen Gesunder. *J. f. Psychol. u. Neurol.*, III, 1904, 55-83; 145-164; 193-215; 283-308; IV, 1904-1905, 24-67. Jung: *Diagnos. Assoziationsst.*, I, 1906, 7-145.
61. KARISE, HIKOZO. A Preliminary Experimental Study of the Conscious Concomitants of Understanding. *Amer. J. Psychol.*, XXII, 1911, 14-64.
62. KENT, GRACE HELEN and ROSANOFF, A. J. A Study of Association in Insanity. *Amer. J. of Insanity*, LXVII, 1910, 317-377.

63. KRAEPELIN, E. Über die Beeinflussung einfacher psychischer Vorgänge. Jena: Fischer, 1892, 258 p.
64. ———. Der psychologische Versuch in der Psychiatrie. Kraepelin: *Psycholog. Arbeiten*, I, 1896, 1-91.
65. KRAMER, F. Literaturbericht. *Beitr. zur. Psychol. der Aussage*, II, 1904-1906, 580-586.
66. KRAMER, F. und STERN, W. Selbstverrat durch Assoziation. *Beitr. zur. Psychol. der Aussage*, II, 1904-1906, 457-488.
67. KRAUS, O. Psychologische Tatbestandsdiagnostik. *Monatsschr. f. Kriminalpsychol. u. Strafrechtsref.*, II, 1905, 58-61.
68. KUTZINSKI, ARNOLD. Über die Beeinflussung des Vorstellungsaufbaues durch Geschichtskomplexe bei Geisteskranken. *Monatsschr. f. Psychiat. u. Neurol.*, XXXIII, 1913, 78-109; 159-178; 254-279.
69. LANGFELD, HERBERT SIDNEY. Suppression with Negative Instruction. *Psychol. Bull.*, VII, 1910, 200-208.
70. ———. Suppression with Negative Instruction. *Psychol. Rev.*, XVIII, 1911, 411-424.
71. LEACH, HAZEL M. and WASHBURN, M. F. Some tests by the association-reaction method of mental diagnosis. *Amer. J. Psychol.*, XXI, 1910, 162-167.
72. LEDERER, MAX. Psychologische Tatbestandsdiagnostik. *Zschr. f. d. ges. Strafrechtswiss.*, XXVI, 1906, 488-506.
73. LEVY-SUHL, MAX. Über experimentelle Beeinflussung des Vorstellungsvorganges bei Geisteskranken. *Zschr. f. Psychol. u. Physiol. d. Sinnesorgane*, XLII, 1906, 128-161; XLV, 1907, 321-340; LIX, 1911, 1-90; also Leipzig: Barth, 1911, pp. 142.
74. ———. Über Einstellungsvorgänge in normalen und anormalen Seelenzuständen. *Zschr. f. Psychother. u. mediz. Psychol.*, II, 1910, 141-164.
75. LEY, AUG. et MENZERATH, PAUL. L'étude expérimentale de l'assoc. des idées dans les maladies mentales. Gand: Van der Hâghen, 1911, pp. 199.
76. LIPMANN, OTTO. Sammelberichte. Neuere Arbeiten zur Psychologie der Aussage. (Wertheimer u. Klein—"Psychologische Tatbestandsdiagnostik.") *Journal für Psychologie und Neurologie*, III, 1904, 249.
77. ———. Literaturbericht. *Zschr. f. Psychol. u. Physiol. d. Sinnesorgane*, XLIII, 1906, 157-158; XLVI, 1907-1908, 306-307.
78. ———. Grundriss der Psychologie für Juristen. Leipzig: Barth, 1908, pp. 70-78, 2nd ed., 1914.
79. ———. Analyses bibliographiques Psychologie judiciaire. (Otto Lipmann et M. Wertheimer: Tatbestandsdiagnostische Kombinationsversuche.) *Année psychol.*, XIV, 1908, 493-494.
80. ———. Die Spuren interessebetonter Erlebnisse und ihre Symptome. (Theorie, Methoden und Ergebnisse der "Tatbestandsdiagnostik.") *Beihefte, Zschr. f. angew. Psychol.*, I, 1911, 1-96.
81. LIPMANN, OTTO und WERTHEIMER, MAX. Tatbestandsdiagnostische Kombinationsversuche. *Zschr. f. angew. Psychol.*, I, 1907-1908, 119-128.
82. LÖFFLER, ———. Zur psychologische Tatbestandsdiagnostik. *Monatsschrift f. Kriminalpsychol. u. Strafrechtsref.*, III, 449.
83. MAYER, A. and ORTH, J. Zur qualitativen Untersuchung der Assoziation. *Zschr. f. Psychol.*, XXVI, 1901, 1-13.

84. MENZERATH, PAUL. Die sogenannten Komplexmerkmale beim Assoziations-experiment. (Discussion by Sommer, Weygandt, Stern, Wertheimer, Dittrich.) Bericht, 5 Kongress f. experim. Psychol. Leipzig: Barth, 1912, pp. 170-175.
85. MEYER, A. Normal and Abnormal Associations. *Psychol. Bull.*, II, 1905, 242-259.
86. MOLL, ALBERT. Die Behandlung sexueller Perversionen mit besonderer Berücksichtigung der Assoziationstherapie. *Zschr. f. Psychotherapie u. mediz. Psychol.*, III, 1911, 1-29.
87. MOORE, JARED S. The Articulation of the Concepts of Normal and Abnormal Psychology. *Amer. J. Psychol.*, XXV, 1914, 283-287.
88. MORAVCSIK, E. Experimente über das psychogalvanische Reflexphänomen. *J. f. Psychol. u. Neurol.*, XVIII, 1911, 186-199.
89. MORAVCSIK, ERNST EMIL. Diagnostische Assoziationsuntersuchungen. *Allg. Zschr. f. Psychiat.*, LXVIII, 1911, 626-673.
90. MÜLLER, VICTOR J. Zur Kenntnis der Leitungsbahnen des psychogalvanischen Reflexphänomens. *Monatsschr. f. Psychiat. u. Neurol.*, XXXIII, 1913, 235-253.
91. MÜNSTERBERG, HUGO. The Third Degree. *McClure's Magazine*, XXIX, 1907, 614-622.
92. ———. On the Witness Stand. New York: McClure, 1908, pp. 71-110.
93. NUNBERG, H. Über körperliche Begleiterscheinungen assoziativer Vorgänge. *J. f. Psychol. u. Neurol.*, XVI, 1910, 102-128, also *Diagnos. Assoziationsst.*, II, 1910, 196-222.
94. OFFNER, MAX. Das Gedächtnis. Berlin: Reuther und Reichard, 1911, pp. 153-154.
95. PELLETIER, M. Les lois morbides de l'association des idées. Paris: Rousset, 1904, 151 p.
96. PETERSON, FREDERICK and JUNG, CARL G. Psycho-physical Investigations with the Galvanometer and Pneumograph in Normal and Insane Individuals. *Brain*, XXX, 1907, 153-218.
97. PFENNINGER, W. Untersuchungen über die Konstanz und den Wechsel der psychologischen Konstellation bei Normalen und Frühdeementen (Schizophrenen). *Jahrb. f. Psychoanalyt. u. Psychopatholog. Forschgn.*, III, 1912, 481-524.
98. PFISTER, O. Die psychanalytische Methode; eine erfahrungswissenschaftlich-systematische Darstellung. (*Pädagogium*, v. I.) Lpz.: Klinkhardt, 1913, 512 p.
99. POTOTZKY, C. Die Verwertbarkeit des Assoziationsversuchs für die Beurteilung der traumatischen Neurosen. *Monatsschr. f. Psychiat. u. Neurol.*, XXV, 1909, 521-529.
100. PRINCE, MORTON. The Unconscious. *J. Abnorm. Psychol.*, III, 1908-1909, pp. 261-297; pp. 335-353; pp. 391-426. Also N. Y.: Macmillan, 1914, pp. 549.
101. RANSCHBURG, PAUL und BÁLINT, EMERICH. Über quantitative und qualitative Veränderungen geistiger Vorgänge im hohen Greisenalter. *Allg. Zschr. f. Psychiat.*, LVII, 1900, 689-718.
102. READ, CHARLES F. Application of the Word-Association Method to an Acute Psychosis. *Amer. J. of Insanity*, LXVIII, 1911-1912, 671-681.

103. RIKLIN, FR. Analytische Untersuchungen der Symptome und Assoziationen eines Falles von Hysterie. *Psychiat.-neurol. Wochenschr.*, 1905, p. 449.
104. ———. Kasuistische Beiträge zur Kenntnis hysterischer Assoziationsphänomene. *J. f. Psychol. und Neurol.*, VII, 1905-1906, 223-252; also *Diagnos. Assoziationsst.*, II, 1910, 1-30.
105. RITTERSHAUS, ERNST. Über Tatbestandsdiagnostik. Vereinsbericht (Vorläufige Mitteilung). *Centralbl. f. Nervenheilk. u. Psychiat.*, XXXI, 1908, 877-878.
106. ———. Die Komplexforschung. *J. f. Psychol. u. Neurol.*, XV, 1909-1910, 61-83; 184-220; XVI, 1910, 1-43.
107. ———. Zur psychologischen Differentialdiagnose der einzelnen Epilepsieformen. *Arch. f. Psychiat. u. Nervenkrankh.*, XLVI, 1910, 1-93; 464-545.
108. ———. Die "Spuren interessebetonter Erlebnisse" und die "Komplexforschung." *Zschr. f. d. ges. Neurol. u. Psychiat.*, VIII, 1911-1912, 273-283.
109. RUSK, ROBERT R. Experiments on Mental Association in School Children. *Brit. J. Psychol.*, III, 1909-1910, 349-385.
110. SCHNITZLER, JOHANN GUSTAV. Experimentelle Beiträge zur Tatbestandsdiagnostik. *Zschr. f. angew. Psychol.*, II, 1908-1909, 51-91.
111. SCHOLL, ———. Versuche über die Einführung von Komplexen in die Assoziationen von Gesunden und Geisteskranken. Sommer: *Klinik für psychische u. nervöse Krankh.*, III, 1908, 197.
112. SCRIPTURE, E. W. Experiments on Subconscious Ideas. *J. Amer. Med. Assoc.*, L, 1908, 521-523.
113. SEMON, RICH. Die Mneme als erhaltendes Prinzip im Wechsel des organischen Geschehens. Leipzig: Engelmann, 2 Aufl., 1908, 360 p.
114. SIDIS, BORIS and KALMUS, H. T. The Study of Galvanometric Deflections due to Psycho-physiological Processes. *Psychol. Rev.*, XV, 1908, 391-396; XVI, 1909, 1-35.
115. SOMMER, R. Lehrbuch der psychopathologischen Untersuchungsmethoden. Berlin, Wien: Urban & Schwarzenberg, 1899, p. 326-388.
116. STEIN, PHILIPP. Tatbestandsdiagnostische Versuche bei Untersuchungsgefangenen. *Zschr. f. Psychol. u. Physiol. d. Sinnesorgane*, LII, 1909, 161-237.
117. STERN, WILLIAM. Mitteilungen. Beitr. z. Psychol. der Aussage, II, 1904-1906, 275-277, 440-441.
118. ———. Abstracts of Lectures on the Psychology of Testimony and on the Study of Individuality. *Amer. J. Psychol.*, XXI, 1910, 270-282.
119. SUTHERLAND, ARTHUR H. Critique of Word Association Reactions. An Experimental Study. Dissertation, Univ. of Chicago, 1913, pp. 46.
120. SWOBODA, HERMANN. Die Perioden des Menschlichen Organismus. Lpz.: Deuticke, 1904, 135 p.
121. TRAUTSCHOLDT, MARTIN. Experimentelle Untersuchungen über die Associationen der Vorstellungen. Wundt's *Philos. Stud.*, I, 1883, 213-250.

122. UMPFENBACH, —. Literaturbericht. *Zschr. f. Psychol. u. Physiol. d. Sinnesorgane*, XXXIX, 1905, 222-223; XLI, 1906, 69; XLIV, 1907, 142-143; XLV, 1907, 298-299.
123. VERAGUTH, OTTO. Das psychogalvanische Reflexphänomen. *Monatsschr. f. Psychiat. u. Neurol.*, XXI, 1907, 387; also Berlin: Karger, 1909, 187 p.
124. WEBER, ERNST. Der Einfluss psychischer Vorgänge auf den Körper. Berlin: Springer, 1910, 426 p.
125. WEHRLIN, K. Über die Assoziationen von Imbezillen und Idioten. *J. f. Psychol. u. Neurol.*, IV, 1904-1905, 109-123; 129-143; also Jung: *Diagnos. Assoziationsst.*, I, 1906, 146-174.
126. WELLS, FREDERIC LYMAN. Some Properties of the Free Association Time. *Psychol. Rev.*, XVIII, 1911, 1-23.
127. —. A Preliminary Note on the Categories of Association Reactions. *Psychol. Rev.*, XVIII, 1911, 229-233.
128. —. Practice Effects in Free Association. *Amer. J. Psychol.*, XXII, 1911, 1-13.
129. —. The Question of Association Types. *Psychol. Rev.*, XIX, 1912, 253-270.
130. WELLS, FREDERIC LYMAN and CADY, FREDERIC B. M. A Critique of the Psycho-Galvanic Reflex with some Experiments. (Abstract of the Paper read at a Meeting of the New England Society of Psychiatry.) *Amer. J. of Insanity*, LXV, 1908-1909, 164-166.
131. WELLS, FREDERIC LYMAN and FORBES, ALEXANDER. On Certain Electrical Processes in the Human Body and their Relation to Emotional Reactions. *Arch. of Psychol.*, II, No. 16, 1908-1911, Mar., 1911, 39 p.
132. WERTHEIMER, MAX. Experimentelle Untersuchungen zur Tatbestandsdiagnostik. *Arch. f. d. ges. Psychol.*, VI, 1906, 59-131.
133. —. Literaturbericht—Zur Tatbestandsdiagnostik. *Arch. f. d. ges. Psychol.*, VII, 1906, 139-140.
134. —. Tatbestandsdiagnostische Reproduktionsversuche. *Arch. f. Kriminalanthropol. u. Kriminalistik*, 1906, p. 293.
135. WERTHEIMER, MAX und KLEIN, JULIUS. Psychologische Tatbestandsdiagnostik. *Arch. f. Kriminalanthropol. u. Kriminalistik*, XV, 1904, 72-113.
136. WEYGANDT, WILHELM. Zur psychologischen Tatbestandsdiagnostik. *Monatsschr. f. Kriminalpsychol. u. Strafrechtsref.*, II, 1905, pp. 435-438.
137. WHITE, WM. A. Theory of the "complex." *St. Louis Interstate Med. Journ.*, XVI, 1909, 243-258.
138. —. Mental Mechanisms. *Nervous and Mental Disease Monograph Series*, No. 8. N. Y.: J. of Nerv. & Mental Disease Publ. Co., 1911, 151 p.
139. WRESCHNER, ARTHUR. Eine experimentelle Studie über die Assoziation in einem Falle von Idiotie. *Allg. Zschr. f. Psychiat.*, LVII, 1900, 241-339.
140. —. Die Reproduktion und Assoziation von Vorstellungen. *Zschr. f. Psychol. u. Physiol. d. Sinnesorgane. Ergänzungsband* 3, Teil I, 1907, 328 p., Teil II, 1909, 599 p.
141. WUNDT, WILHELM. Grundzüge der physiologischen Psychologie. Engelmann: Leipzig, III, 1911, pp. 436-456; 519-543.

142. YERKES, ROBERT M. and BERRY, CHARLES S. The Association Reaction Method of Mental Diagnosis. (Tatbestandsdiagnostik.) *Amer. J. Psychol.*, XX, 1909, 22-37.
143. ZIEHEN, TH. Die Ideenassoziation des Kindes. Sammlung von Abhandlungen aus dem Gebiete der pädagogischen Psychologie und Physiologie. Vol. I, Heft 6, 1898, 1-66; Vol. III, Heft 4, 1900, 1-59.
144. ———. Leitfaden der physiologischen Psychologie. Jena: G. Fischer, 1906, p. 176-204.

K. APPENDIX

A TABULAR LIST OF COMPLEX INDICATORS

I. *Qualitative*

- (1) Content
- (2) Whispered Response
- (3) Failure to Understand
- (4) False Reproduction
- (5) False Recall
- (6) Perseveration
 - (a) Response
 - (b) Stimulus
 - (c) Affect
- (7) Inhibition
- (8) Failure to Respond
- (9) Quotations
- (10) Titles
- (11) Sentences
- (12) Symbolism
- (13) General Concepts Hiding the Meaning
- (14) Addition of the Article
- (15) Naming of an Object in the Examiner's Room
- (16) Peculiar Form of the Response
- (17) Unusual Response
- (18) Errors in Response
- (19) Assimilation
- (20) Vacuum
- (21) Unmeaning Responses
- (22) Nonsense
- (23) Incomplete Responses
- (24) Supplementations of Stimulus Words
- (25) A-symmetrical Responses
- (26) Post-critical Responses
- (27) "Versprechen," "Verhören," ("Verlesen")
- (28) "Komplexvertreter" (Complex-surrogate)
- (29) Translations
- (30) Interjections or Single Letters

II. *Quantitative*

- (1) Time

III. *Physiological*

- (1) Psychogalvanic Reflex
- (2) Electro-motor Heart Flow
- (3) Pulse
- (4) Respiration
- (5) Blood Pressure
- (6) Involuntary Movements, or Tremors of the Hands or the Limbs
- (7) Ataxiagraph (Involuntary Bodily Sway)
- (8) Knee-jerk
- (9) Lifting Ability of the Finger (Ergograph)
- (10) Tapping Test
- (11) Strength of Grip
- (12) Facial Expression (Reddening, etc.)
- (13) Tone of Voice in Response
- (14) Ability to Concentrate (Disturbances of Attention)
- (15) General Conduct and Behavior (Coughing, Clearing the Throat, etc.)

KENT-ROSANOFF ASSOCIATION SERIES

- | | | |
|---------------|-------------|--------------|
| 1. table | 35. needle | 69. ocean |
| 2. dark | 36. red | 70. head |
| 3. music | 37. sleep | 71. stove |
| 4. sickness | 38. anger | 72. long |
| 5. man | 39. carpet | 73. religion |
| 6. deep | 40. girl | 74. whiskey |
| 7. soft | 41. high | 75. child |
| 8. eating | 42. working | 76. bitter |
| 9. mountain | 43. sour | 77. hammer |
| 10. house | 44. earth | 78. thirsty |
| 11. block | 45. trouble | 79. city |
| 12. mutton | 46. soldier | 80. square |
| 13. comfort | 47. cabbage | 81. butter |
| 14. hand | 48. hard | 82. doctor |
| 15. short | 49. eagle | 83. loud |
| 16. fruit | 50. stomach | 84. thief |
| 17. butterfly | 51. stem | 85. lion |
| 18. smooth | 52. lamp | 86. joy |
| 19. command | 53. dream | 87. bed |
| 20. chair | 54. yellow | 88. heavy |
| 21. sweet | 55. bread | 89. tobacco |
| 22. whistle | 56. justice | 90. baby |
| 23. woman | 57. boy | 91. moon |
| 24. cold | 58. light | 92. scissors |
| 25. slow | 59. health | 93. quiet |
| 26. wish | 60. bible | 94. green |
| 27. river | 61. memory | 95. salt |
| 28. white | 62. sheep | 96. street |
| 29. beautiful | 63. bath | 97. king |
| 30. window | 64. cottage | 98. cheese |
| 31. rough | 65. swift | 99. blossom |
| 32. citizen | 66. blue | 100. afraid |
| 33. foot | 67. hungry | |
| 34. spider | 68. priest | |

JUNG ASSOCIATION SERIES

- | | | |
|--------------|------------------|----------------|
| 1. head | 35. mountain | 69. part |
| 2. green | 36. to die | 70. old |
| 3. water | 37. salt | 71. flower |
| 4. to sing | 38. new | 72. to beat |
| 5. dead | 39. custom | 73. box |
| 6. long | 40. to pray | 74. wild |
| 7. ship | 41. money | 75. family |
| 8. to pay | 42. foolish | 76. to wash |
| 9. window | 43. pamphlet | 77. cow |
| 10. friendly | 44. despise | 78. friend |
| 11. to cook | 45. finger | 79. luck |
| 12. to ask | 46. expensive. | 80. lie |
| 13. cold | 47. bird | 81. deportment |
| 14. stem | 48. to fall | 82. narrow |
| 15. to dance | 49. book | 83. brother |
| 16. village | 50. unjust | 84. to fear |
| 17. lake | 51. frog | 85. stork |
| 18. sick | 52. to part | 86. false |
| 19. pride | 53. hunger | 87. anxiety |
| 20. to cook | 54. white | 88. to kiss |
| 21. ink | 55. child | 89. bride |
| 22. angry | 56. to take care | 90. pure |
| 23. needle | 57. lead pencil | 91. door |
| 24. to swim | 58. sad | 92. to choose |
| 25. voyage | 59. plum | 93. hay |
| 26. blue | 60. to marry | 94. contented |
| 27. lamp | 61. house | 95. ridicule |
| 28. to sin | 62. dear | 96. to sleep |
| 29. bread | 63. glass | 97. month |
| 30. rich | 64. to quarrel | 98. nice |
| 31. tree | 65. fur | 99. woman |
| 32. to prick | 66. big | 100. to abuse |
| 33. pity | 67. carrot | |
| 34. yellow | 68. to paint | |

JUNG'S ASSOCIATION SERIES AS MODIFIED BY WHITE

1. head	41. volume	81. brother
2. green	42. to despise	82. to harm
3. water	43. teeth	83. stork
4. to prick	44. correct	84. false
5. angel	45. crowd	85. anxiety
6. long	46. book	86. to kiss
7. ship	47. unjust	87. fire
8. to plough	48. frog	88. dirty
9. wool	49. to cut	89. door
10. friendly	50. hunger	90. to choose
11. table	51. white	91. hay
12. to carry	52. ring	92. quiet
13. insolent	53. to listen	93. scorn
14. to dance	54. pencil	94. to sleep
15. lake	55. woods	95. month
16. sick	56. apple	96. colored
17. proud	57. to meet	97. dog
18. to boil	58. low	98. to talk
19. ink	59. love	99. carriage
20. angry	60. glass	100. sky
21. needle	61. to quarrel	101. straw
22. to swim	62. goat	102. baby
23. journey	63. large	103. to lie
24. blue	64. potato	104. blood
25. bread	65. to paint	105. duty
26. to threaten	66. part	106. bed
27. rich	67. old	107. to rent
28. lamp	68. flower	108. sorrow
29. tree	69. to strike	109. mirror
30. to sing	70. box	110. prison
31. sympathy	71. wild	111. knee
32. yellow	72. bright	112. to live
33. mountain	73. family	113. change
34. to play	74. to wash	114. barn
35. sail	75. cow	115. snake
36. new	76. stranger	116. to uncover
37. custom	77. luck	117. policeman
38. to ride	78. to tell	118. wagon
39. wall	79. hesitation	119. judge
40. stupid	80. narrow	120. night

Other words may be interspersed if significant.